Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

VOL. IX.—NO. 10. (NEW SERIES.) | NEW YORK, SEPTEMBER 5, 1863. | SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE.

Improved Bee Palace.

No delicacy is more delightful, or acceptable to all palates, than honey made from plants free from strong odors and disagreeable flavors. Bees when well cared for will produce large quantities; but if left to chance, and exposed to the inroads and attacks of moths and other vermin, the quality of the honey is depreciated, and the amount not so great as under more favorable circumstances. Much more attention is now given to the care of bees than formerly, and many persons in different parts of the country make the habits of these insects their especial study. From this intimacy there arises a practical knowledge of the subject, which is greatly to the advantage of those interested in the science of bee-keeping; for the art of rearing these little insects successfully has almost attained to the dignity of a scientific pursuit. Herewith are published several views of the construction and arrangement of Dickinson's bee palace, a full description of which will be found subjoined.

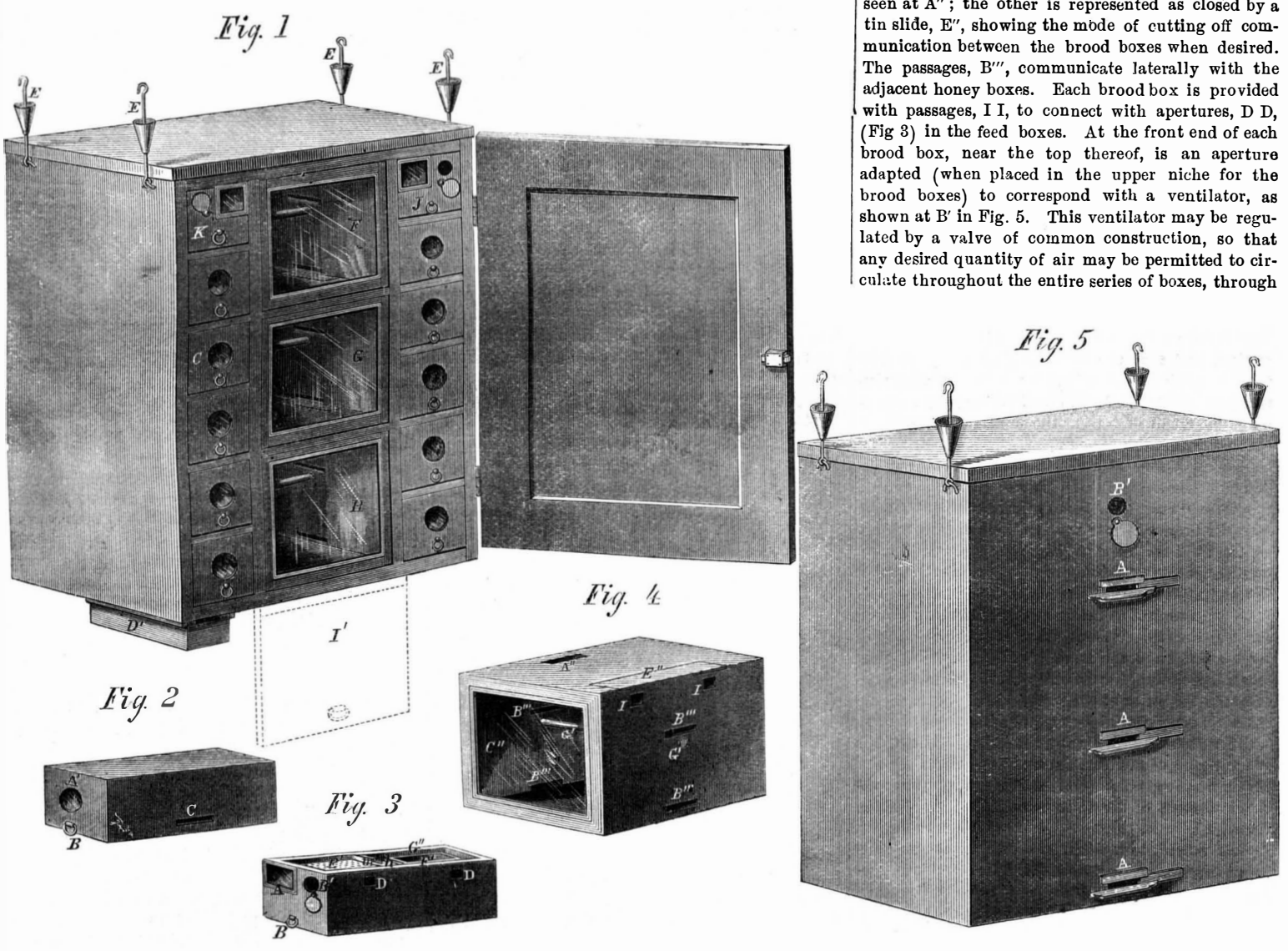
Fig. 1 is a perspective view as seen from the rear side; the door being left open to show the interior arrangement of the brood, honey, and feed-boxes. Fig. 2 is a perspective view of the honey box. Fig. 3 is a view of the feed-box. Fig. 4 shows the brood box. Fig. 5 is the hive, as seen from the front side, showing the main entrances, A, for the bees open.

The invention consists of a rectangular box divided by upright and horizontal partitions, so as to admit the desired number and arrangement of the several brood, honey and feed-boxes, together with a decoy drawer for moths; the whole structure to be suspended by four iron hooks, one at each upper corner of the hive, which are encased by cups in the form of inverted cones. These cups are to be filled with any suitable liquid, for the purpose of excluding and destroying vermin.

The palace, as represented in Fig. 1 is composed of three brood boxes, F G H, ten honey boxes, C, and two feed-boxes, J K, all communicating with each other as hereinafter described. Each honey and brood box is similarly constructed, so that the description of one of each will suffice. In Fig 2, A′ represents a glass of suitable dimensions, C the bee passage, and B a ring or knob whereby the box may be withdrawn from its casing, when desired. This honey box is provided with a bee passage in each side, which communicates with the passages in the brood boxes. The brood box, Fig. 4, is provided with a bee passage in its front end, at the bottom (not shown in the engraving) communicating with an outer bee passage, A, as shown in Fig. 5. The rear end of the brood box is furnished with a pane of glass, C″, which permits the inspection of the brood. At G′ may be seen the comb supporter. The top of the box is provided with two apertures which afford the means of communication with the other brood boxes; one of these apertures can be seen at A″; the other is represented as closed by a tin slide, E″, showing the mode of cutting off communication between the brood boxes when desired. The passages, B‴, communicate laterally with the adjacent honey boxes. Each brood box is provided with passages, I I, to connect with apertures, D D, (Fig 3) in the feed boxes. At the front end of each brood box, near the top thereof, is an aperture adapted (when placed in the upper niche for the brood boxes) to correspond with a ventilator, as shown at B′ in Fig. 5. This ventilator may be regulated by a valve of common construction, so that any desired quantity of air may be permitted to circulate throughout the entire series of boxes, through the medium of their respective apertures or passages.

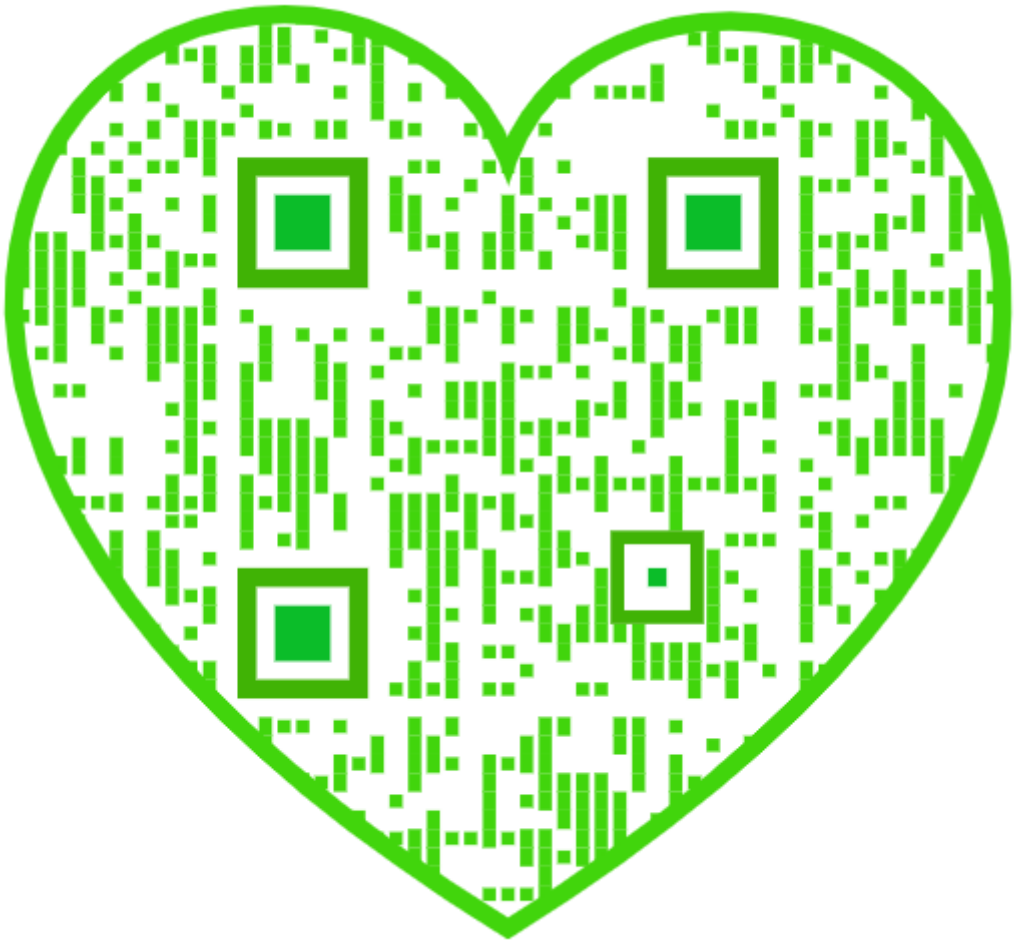
The brood boxes may be constructed without bottoms, so as to afford ready access to the inside thereof, for the purpose of cleaning, or they may be provided with adjustable bottoms. Fig. 3 is a perspective view of the feed box from the rear, which is shown at J in Fig. 1; it is equally divided by a transverse partition, *m*. The water department, E′, is provided with a perforated float of pine wood or other suitable material, and *h* is a passage communicating from the watering department to the flour box, G″, and salt pan, F′.

The suspension hooks, E E, are provided near their lower ends with cups, the shape of each being that of an inverted cone. When the hive is suspended, these cups are supplied with water, or any



DICKINSON'S PATENT BEE PALACE.

© 1863 SCIENTIFIC AMERICAN, INC.



other suitable liquid, for the purpose of destroying and consequently excluding any vermin which may attempt to enter the hive. The door, I', is hinged to the underside of the hive, and closed by a button, whereby the palace may be readily cleaned when desired. The underside of the hive is also provided with a moth decoy drawer, D', which is filled with honey comb. The moth miller will invariably enter this apartment and deposit its larvæ; the apiarist, therefore, is enabled by the existence of this chamber, not only to destroy the germs which have been deposited in the comb, but the moth miller itself; thereby destroying one of the greatest pests which he has to encounter.

The patent for this invention was procured through the Scientific American Patent Agency, on May 26, 1863. Further information can be obtained by addressing the inventor, Mr. Wm. M. Dickinson, Goshen, Elkhart Co., Ind.

NEW BOOKS AND PUBLICATIONS.

HEAT CONSIDERED AS A MODE OF MOTION; by D. Tyndall, F. R. S., published by D. Appleton & Co., Broadway, New York.

This volume is the product of twelve lectures delivered at the Royal Institution, London, in 1862, and is the most valuable contribution to scientific literature that has been published in many years. The author states that he has endeavored "to bring the rudiments of a new philosophy within the reach of persons of ordinary intelligence." It is certainly a most attractive and instructive book, and fully explains the modern philosophy of force as applied to heat. It is illustrated with a large number of engravings to explain experiments, showing the convertibility of heat into mechanical power, and mechanical power into heat—the correlation of the physical forces. The "new philosophy," so called, is rather an old philosophy, better understood in its details. It was known more than a century ago that heat could produce mechanical motion in the steam engine, and that the latter could develope heat by friction, so that heat and mechanical power were mutually convertible. But to modern investigators belongs the credit of tracing the subtile effects of heat through innumerable operations, and measuring the quantities of force as accurately as weighing grains of gold. Professor Tyndall is very careful in using the term "heat as a mode of motion." We have seen the term "heat is motion," used by scientific writers; but motion means a body changing position or place, while heat is a force. We will now give a few quotations from this remarkable and useful volume, with respect to heat being developed by falling water. He says, "There are friends before me who have stood amid the foam of Niagara. Had they when there, dipped sufficiently sensitive thermometers into the water at the top and the bottom of the cataract, they would have found the latter a little warmer than the former. The sailor's tradition is theoretically correct, that the sea is rendered warmer through the agitation produced by a storm, the mechanical dash of the billows being ultimately converted into heat."

With respect to friction, he says, "Whenever friction is overcome, heat is produced, and the heat produced is the measure of the force expended in overcoming friction. The heat is simply the primitive force in another form, and if we wish to avoid this conversion, we must abolish the friction. It is the object of a railway engineer to urge his train bodily from one place to another, and he wishes to apply the force of his steam, or his furnace, which gives tension to the steam, to this particular purpose. It is not his interest to allow any portion of that force to be converted into another form of force which would not further the attainment of his object. He does not want his axles heated, hence he avoids, as much as possible, expending his power in heating them. In fact he has obtained his force from heat, and it is not his object to reconvert the force thus obtained into its primitive form. For every degree of heat generated by the friction of his axles, a definite amount would be withdrawn from the urging power of his engines. There is no force lost absolutely. Could we gather up all the heat generated by the friction, and could we apply it mechanically, we should by it be able to impart to the train the precise amount of speed which it had lost by friction. A station is approached at the rate of forty miles per hour, the brake is applied, and smoke and sparks issue from the wheel on which it presses. The train is brought to rest. How? simply by converting the entire moving force which it possessed, at the moment the brake was applied, into heat."

"Davy found that when a gunlock with a flint was discharged in vacuo, no sparks were produced; but the small particles of steel struck off, when examined by the microscope, showed signs of fusion." "A bullet in passing through the air is warmed by the friction, and the most probable theory of shooting stars is that they are small planetary bodies, revolving around the sun, which are caused to swerve from their orbits by the attraction of the earth, and are raised to incandescence by friction against our atmosphere."

In 1798, while that eminent American—Count Rumford—was engaged in boring cannon at Munich, he was so forcibly struck by the large amount of heat developed in the process of boring, that he devised a special apparatus to examine the generation of heat by this mode. He made an iron cylinder, into which he fitted a fixed solid plunger which pressed against its bottom. The box which surrounded this cylinder contained 18 lbs. of water, and in this he placed a thermometer. The cylinder was then made to revolve, pressing on the plunger, and in one hour the temperature of the water was raised from 60° to 107° Fah., and in two hours and twenty minutes the water boiled. Persons who were invited to witness the experiment were astonished to see water boiling without fire. Count Rumford was delighted with the results, and he expressed the opinion then, that motion was convertible into heat. The theory elucidated in this work respecting heat, is that heat is a kind of molecular motion; and that by friction, percussion, or compression, this motion may be generated, as well as by combustion. The old material theory of heat may be said to be defunct. The work is written in a charming style, and is the most popular exposition of the dynamical theory of heat that has yet appeared.

COAL TAR COLORS; by Professor Dussauce, published by Henry Carey Baird, 406 Walnut street, Philadelphia, price $2.50.

This is a treatise on the history and preparation of those beautiful aniline colors, now so common, and which are manufactured from one of the constituents of coal tar. Such colors are prepared ready-made to the dyer, either dry, in powder, or dissolved in alcohol, for immediate use. They are applied in a dissolved state to color silk and wool, by simply mixing a small quantity of any one of them with water in a warm bath, then handling the fabric in this until it has acquired the desired shade. A very minute quantity of the red color, will dye a pink; and all intermediate shades up to red may be dyed by adding a larger quantity. The purple aniline will dye a lilac, and all intermediate shades up to purple, according to the quantity of coloring matter that is employed. Thus dyeing with such colors has rendered the art a very simple affair, compared with the old modes of dyeing with vegetable extracts. Many dyers have complained to us that they have found it far more difficult to dye aniline blue than any other color. This is noticed in the book, and the mode of dyeing this blue on silk is described in substance as follows. After being cleaned, the silk is first worked in a dilute solution of aniline blue, acidulated with sulphuric acid, until the depth of color desired is obtained. In this operation the bath is kept at a moderate temperature, then raised to the boiling point, after which the silk is taken out and rinsed in cold water. After this it is run through strong soap suds, washed in water, run through a weak bath of sulphuric acid, and afterwards thoroughly washed in water and dried. This described mode of dyeing aniline blue may be useful to some of our dyers.

UNITED STATES ARMY AND NAVY JOURNAL.

This is the title of a new weekly newspaper devoted to the interests of the Army and Navy, to be published by D. Van Nostrand, 192 Broadway, this city; edited by W. C. Church—proprietor—late of the staff of Major-General S. Casey. An ably edited paper of this character seems to be demanded, by the importance which military and naval affairs have now assumed in our country. The editor states that it will be his object to make this serial interesting and reliable in all news relating to military and naval operations, and the discussion of all questions connected with such subjects. It will contain, from week to week, full official lists of all appointments, promotions, changes of station, deaths, resignations, dismissals, and other changes in the *personnel* of the two services: a full and reliable record of all active operations by the Army and Navy: a summary of all official orders proper for publication: a full account of the operations of the Coast Survey, the Revenue Service, and all changes among the officers of these two departments: changes in the medical department of the two services, with matters relating to military hygiene, surgery and the sanitary condition of the Army and Navy: descriptions of inventions and improvements relating to the Art of War, and of experiments and discoveries illustrative of military science in this country and abroad: narratives of military and naval exploits and adventures: correspondence from members of the two services, and answers to questions in regard to difficult or disputed tactical matters, or other subjects suggested by correspondents: an account of important movements of foreign armies and navies, with notices of changes in the *personnel* of the services of foreign nations: criticisms upon current literature and art, of interest to the Army and Navy: articles upon military and naval engineering: stations of naval vessels in commission, reports of Navy Yards, and movements of foreign naval vessels, with editorial discussions upon subjects of interest to our soldiers and sailors: a summary, in short, of whatever occurs in all parts of the world of value to our Army and Navy, and no effort will be spared to make the *Journal* complete in all its parts. It is the aim of the proprietor to make it not only a complete military and naval gazette, but at the same time a high-toned, reliable, lively journal, which will be read with interest by the families and friends of those connected with the public service and by the great body of the intelligent public. The subscription is $5 per annum.

ATLANTIC MONTHLY: Ticknor & Fields, Boston, Mass.:

This standard periodical is always a welcome guest upon our table, and the contents never disappoint us. The September number contains, among other interesting matter, a paper, by Professor Agassiz, on the Geological Age of the World, which alone is worth a year's subscription. There is a disquisition on Thomas De Quincey, another on Robert and Clara Schumann, and other articles of greater or lesser importance, with the usual amount of poetry.

Petroleum and Health.

A memorial was lately sent to the Liverpool Health Committee, signed by several hundred citizens, and complaining of the storage of petroleum in their neighborhood as "a nuisance and prejudicial to health." The question was referred to Dr. French, the medical officer of the Board of Health; and, after a very thorough personal examination of the case, he reported that, while he had no hesitation in pronouncing the oil a nuisance on account of its strong offensive smell, his investigation satisfied him that petroleum was not prejudicial to health. In order to make a full investigation, he visited 153 houses in the vicinity of the oil stores, and found no cases of sickness arising from the petroleum. His report says:—

"The medical officer of health particularly observed the condition of the children and young people—first, as being more sensitive to the effects of noxious vapors; second, as being less likely to be sufferers from either intemperance, or those anxieties of life which give to the countenance the aspect of disease. He never remembers to have seen in any district of the town, so many healthy, ruddy-faced children, or more healthy-looking young people."

THE introduction of machine-made bags dates subsequent to the Exhibition of 1851, and all branches of trade are now using them. The manufacture of the bags consumes an immense quantity of gray and brown paper. One of the large London works turns out 130,000 bags per day.

© 1863 SCIENTIFIC AMERICAN, INC.

THE SCHOOLMASTER ABROAD—NEW DISCOVERY IN ENGINEERING.

A contributor to the *Evening Post*, of the 23d ult., gives a most lucid and graphic description of the great marine ram *Dunderberg*, now being built by W. H. Webb, Esq., of this city; and after detailing the construction of the hull, he describes the machinery with a power of expression, which throws all the science and skill of our Smiths, Copelands, Haswells, and other experienced engineers into the back ground. He says, "The engines are of six thousand horse power. The two cylinders are one hundred inches in diameter and three feet apart; the cylinders will be assisted by an independent air-pump." We deem it worthy of repitition:—"The two cylinders are three feet apart, and are to be assisted by an independent air pump" The schoolmaster is certainly abroad, in New York, among the steam rams.

Another modest adventurer in the field of science reports in the *Daily Times*, that the *Dictator's* engines are to be 100 inches diameter in the cylinder, and that they will drive a propeller 2¼ feet diameter, the largest in the country, weighing some 39,000 pounds; adding further that this remarkable wheel "has four plates" and that "it is nearly ready to attach to the screw." One difficulty to be apprehended from the air-pump is, that being independent, it may some day, refuse its operation. Then what would become of the "two cylinders, each 100 inches in diameter, and placed three feet apart." We have seen these particulars copied in many of our exchanges, and felt pleased to think that our countrymen were not debarred the privilege of obtaining information respecting the details of the war vessels now building.

A WAY TO REDUCE WAGES.

If Satan, in his hatred of mankind, should set himself to devise the best mode of lowering the rate of wages, he could find no plan more effectual than that of inducing mobs to destroy labor-saving machinery.

Wealth is being constantly produced by labor, and the amount produced is in proportion to the quality and supply of the tools and machinery that the laborers have to work with. A man can produce something with his naked hands, more with the aid of an axe or hoe, more still with a horse and plow, and still more with a steam engine, or saw-mill.

When wealth is produced, it is divided between the laborer who does the work, and the man who owns the tools or machinery that the laborer works with—the capitalist; the laborer usually obtaining his portion in the form of wages. It is manifest, therefore, that when the product of wealth is small there will be but little to divide, and wages must be low.

We accordingly find that in all countries where but little labor-saving (or rather labor doing) machinery is used, wages are low. The price of labor in England and the United States has multiplied several fold since the invention of the steam engine, the spinning jenny, the cotton gin and the power loom. We have before us some carefully collected statistics of the rates of wages in England in 1642—at the time when the oppressions of Charles I were driving emigrants in such crowds to this country. An agricultural laborer received 18 cents per day, or if he had his food, 12 cents. A weeder had 8 cents, a watchman 8 cents and a carpenter 26 cents. At the present time wages are even lower than these rates in all countries where labor-saving machinery is not employed.

In the division of the product, the interest of the laborer is adverse to that of the capitalist, but both are alike interested in having a large quantity to divide, and it is, therefore for the interest of both that all labor-saving machinery should be kept in active operation.

A Bad Practice.

We notice in some of our cotemporaries long lists of names of such citizens as are exempt by law from military duties; together with the particular reason why they are thus exempt. Now we may well know that war necessarily introduces a state of things which seems to be severe; simply because, as a people, we have hitherto been spared the horrors of war within our own borders. But we cannot justify nor sanction this system of publicly exposing to prurient curiosity all the special ills to which infirm man is heir. Such a practice is a radically bad one, and well calculated to work irreparable mischief in many cases. We hope this publication will not be persisted in, unless there are better reasons for its continuance than we can now think of. If examining surgeons are honorable men, they will not countenance any attempt on the part of conscripts to shrink their responsibility to the nation in this pressing emergency.

MISCELLANEOUS SUMMARY.

Immutability of Species.—The *Scottish Farmer* says:—"Those who have studied the natural history of living forms carefully, whether in the animal or vegetable kingdoms, are quite satisfied as to the truth of the axiom, that "one species never passes into another species." All the support which can be brought in favor of such changes having taken place, is merely traditionary, and no more worthy of belief than the traditions descending from heathen mythology, such as that Lombardy poplars are the metamorphosed sisters of Phaeton; or that the garden white lily sprang from the youth Narcissus as he pined away for his own image; or that the Hyacinth sprang from the blood of a youth killed by Zephyrus with the blow of a quoit.

The editor of the Scranton (Pa.) *Republican* says:—"We saw a curious embellishment the other day—a five-dollar bill on the Pottsville Bank, which contains, in one corner, a vignette of James Buchanan. Some loyal person had bunged his eyes with red ink, drawn a gallows above his head, from which a rope was suspended, that went round his neck, and then branded his forehead with the word 'Judas.' This is but one of hundreds. The bank has had to call in all its issues with that portrait on it; so unmistakable are the manifestations of popular indignation against the man who might, had he had the will or the pluck, have nipped this rebellion in the bud, as Jackson did before him."

Speed of Carrier Pigeons.—It appears from a trial lately made at Bourges, that carrier pigeons can still compete in speed with railways. Last week one hundred and forty five pigeons were liberated at Bourges at five o'clock in the morning, to decide a wager. The first prize was gained by a pigeon which arrived at his pigeon-house at Verviers, at fifty four minutes past twelve. The last arrival was at eleven minutes past one. Thus, in less than nine hours, these birds performed a distance of one hundred and fifty leagues, or three hundred and seventy five miles—a speed which no French railway can equal.

Compressed Bread.—To replace the indigestible hard biscuit used in the French army and navy, a preparation of compressed bread has been introduced. Small loaves, baked in tins, are thoroughly dried, and then pressed into cakes (four inches square and three quarters of an inch thick) by a machine, invented and patented by M. Marinoni, of Paris. The cakes recover their original dimensions when put into water.

[We should think "hard tack" was tough enough, in all conscience, without compressing bread.—Eds.

Ghosts.—Ghosts are now produced in London as easily as the figures from a magic lantern. In one of the theatres recently a ludicrous contretemps took place. The spectral illusion is produced by throwing a strong light on an object below the stage level, from whence the reflection is thrown up through a trap-door—a large plate of glass with all the appearance but none of the solidity of life. One of the scene shifters got in the way of the light recently, and was presented to the audience in the act of drinking a pint of beer, with his shirt sleeves rolled up.

Crops in Europe.—All the intelligence recently received in regard to the crops is favorable. The *European Times* says that from all parts of the United Kingdom—east, west, north and south—the crop accounts are most encouraging; and in the south of England the harvest has been unusually early, as well as productive. The cereal and the potato crops are all good, and from Ireland the most cheerful accounts come. Nevertheless it would hardly be safe to assume that it will not be necessary to import pretty largely from the United States.

The Paris correspondent of the London *Morning Post* has found, on inspection, that most of the novels in the library of Mr. Merridew, the English bookseller at Boulogne, have been re-edited by fair readers. Marginal notes abound, from Sir Walter Scott's serious romances, down to the "Woman in White" of our own day. *Vanity Fair* has been elaborately corrected by female critics. Wherever the author has made any reflection on "lovely women," a fair hand has written: "No, Mr. Thackeray, you are wrong; you do not know the female heart;" or, "A good man could not have written this."

To Pickle Onions.—Peel the onion, cut it into rings, and spread it upon a dish; then lightly sprinkle it with salt; in about half an hour pour off the watery brine, and put the onion into a jar. Now pour on scalding vinegar enough to cover the pickle made. Boil up with every pint of vinegar, before it is used, half an ounce each of whole black pepper and allspice, and a quarter of an ounce each of cloves and ginger. Keep the jar on the oven for one or two days, then tie down with a piece of glazed muslin. In a month or so it is fit for use.

The Draft is progressing in New York, under the majesty of the law, and in the presence of a legion of brave men, who have fought under the old flag with splendid heroism. These veterans bearing the honorable scars of many a well fought field, are receiving every attention from the law-abiding citizens of the metropolis. The horrors of the July mob haunt us no longer, and all feel a sense of security in the presence of the brave defenders of the country and Government.

An effort is making in California for the cultivation of tea. Mr. H. B. Sonntag, at the Mission, a short distance from San Francisco, has one thousand thrifty-looking plants of this year's growth, from seed procured by a gentleman in China. As tea plants must be four years old before the leaves are suitable for picking, some time must elapse before the success of the experiment of growing tea in California can be determined.

New Kind of Farming Machine Wanted.—A correspondent of one of our agricultural papers writes to the editor, saying that there is a want existing among farmers for a mill to crush boiled roots, such as turnips, potatoes and other kinds, so that they will be fit for cattle to eat. Such an apparatus as this may be easily and cheaply made, and we dare say some inventor will take the hint and act on it.

The climate of the Northern States is certainly one of the most curious features of the country. On the 25th instant the thermometer ranged between 88 and 90 degrees; twelve hours thereafter it had fallen nearly 30 degrees. In the first instance few localities were cool enough for comfort; in the second, overcoats were endurable and fires not all disagreeable. Truly, the weather is fickle and uncertain enough, and extremely trying to frail constitutions.

Destruction of a Supply Steamer.—A steamer loaded with ammunition was recently blown up at Vicksburgh by the carelessness of those in charge. A negro was carrying a percussion shell on board, when he let it fall, and an immediate explosion ensued; fire was communicated to the remainder of the ammunition, and it also exploded and blew the boat to atoms, killing some 156 men. The utmost recklessness is visible in handling munitions of war.

World's Fair for 1867, in Paris.—An *Exposition Universelle* will be held in Paris, from the first of May till the last of September, 1867, open to all the world. It is expected to excel in magnificence any that has yet been held in France or England.

Extraordinary as it may appear, says an exchange, a piece of brown paper folded and placed between the upper lip and the gum will stop bleeding of the nose. Try it.

It is said that if the mouth of a brick oven be stopped with a bundle of wet straw, the bread baked therein will have a beautiful gold-colored crust, which renders it extremely appetising.

The U. S. brig *Bainbridge* was recently lost at sea with all on board except one colored man, who, after drifting about in an open boat some time, was picked up by a passing vessel.

© 1863 SCIENTIFIC AMERICAN, INC.

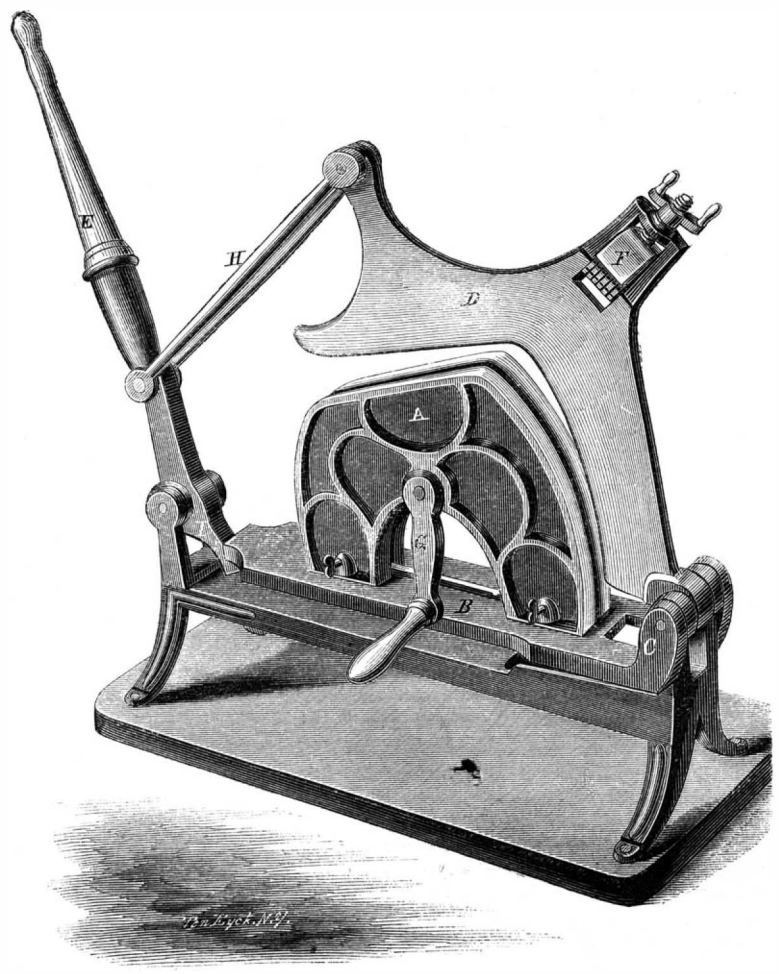
Improved Boot Crimper.

The subjoined engravings represent a new and improved boot crimping machine lately invented, the novelty of which consists in a movable crimping plate, combined with pressure plates, in such a manner that both may receive a motion in opposite directions, whereby the operations are much facilitated.

The machine consists of the pressure plates, A, fastened to the frame, B, by a joint, C, on which they work easily; between these plates the crimping plate, D, works through the agency of the lever. Upon the upper part of the plate, D, will be seen a clamping device, F, which holds the boot front; and in the side of the pressure plates there is fitted a strong screw, worked by the handle, G. When the front to be crimped is placed on the plate devoted to that purpose, the handle of the lever, E, is brought down, when the double action of the same, through the links, H, and the toe, I, causes both parts to approach each other, as before mentioned; there are also two small set screws at the bottom of the pressure plate, by which the width of the same can be quickly and easily adjusted.

These combinations, it is claimed, will effect the crimping of a boot front more expeditiously than by any other machine now in use. The apparatus is very conveniently arranged, being especially adapted to the purpose for which it is designed; it is simple and strong, and, we think, will prove a success.

An application for a patent is now pending through the Scientific American Patent Agency, by Thomas Madgett. Further information may be had by addressing George Parr, assignee, Buffalo, N. Y.



MADGETT'S PATENT BOOT CRIMPER.

DISCOVERIES AND INVENTIONS ABROAD.

Red Coal Tar Color.—A patent has been taken out by Wm. Spence, of Manchester, England, for making a red coloring agent from phenic or carbolic acid, obtained from coal tar as follows:—About 23 lb. of phenic or carbolic acid; from about 10 to 20 lb. of oxalic acid; and from about 7 to 14 lb. of sulphuric acid. This mixture is heated until the coloring matter is formed of the requisite color and consistence. When this operation is considered to be finished, the matter is washed with boiling water, in order to remove the excess of acid. It is then in the state of a light pitch, and with a green shade of cantharides. It may be dried and reduced to powder. To prepare it for dyeing, the inventor takes about 2½ lbs. of this and 5½ lbs. of common ammonia; places them in a closed metallic vessel, then heats to a temperature of about 270° Fah., for about three hours. This is allowed to cool, and then the vessel is opened. The matter originally introduced therein becomes completely dissolved in the ammonia, yielding a liquor rather thick, and possessed of considerable coloring matter. This liquor when heated by acids furnishes a deep red precipitate, which is a fast coloring matter, capable of dyeing silk, wool, and other textile materials red. The matter thus prepared is called "peonine," and is applicable to dyeing and printing generally.

Blue Color.—Mr. Spence also produces a blue color from the peonine thus obtained, as follows:—To 5 lbs. of peonine, 6 lbs. of aniline are added, and the mixture is heated to a temperature near the boiling point, which heating is maintained for some hours, until the material is completely transformed. The result thence obtained is a blue coloring matter, which is purified by successive washings; first, with boiling water acidulated with sulphuric, hydrochloric, or other acids; secondly, with heated coal oil; and thirdly, with a dilute solution of caustc, soda, potash, or other alkalies. The matter thus obtained is passed into acidulated boiling water, then dried. It is then in a state of powder, with golden shades, soluble in alcohol, methyle, and other spirits, and the solutions of which may be used directly for dyeing and printing. The coloring matter thus obtained is called "azuline," and is applicable to dyeing and printing generally.

Coating Iron and Steel with Copper.—A patent has been secured by W. & H. Bowser, of Glasgow, for coating iron and steel in plates or bars, with copper or brass, as follows:—A reverberatory furnace for heating the iron or steel is provided, and a coating chamber is used in close communication with the furnace. The iron, or steel having its surface cleaned, is raised to a welding heat in the reverberatory furnace; it is then moved to the coating chamber, where the copper is applied to its surface, in the form of grains, or in sheets. The heat of the iron or steel melts the copper on its surface, and the two metals thus become united, the copper forming a thick coating. It is stated that when these operations are performed skillfully, the coating metal becomes so intimately and firmly united to the more oxidizable metal, that it may be reheated, rolled, and hammered without the metals becoming separated.

Rifle Telescopes.—The English have borrowed the use of the telescope for rifles from America, and they are now making some of their target rifles with telescopes, almost similar to those which have been used here for over twenty years. A patent has been taken out by D. Davidson, of Edinburgh, for an improvement on such telescopes. The field bar of his telescope is furnished with two slides, moving at right angles to each other, each slide carrying a cross hair, or line; one of such slides being horizontal and the other vertical, both worked by screws for adjusting them. The horizontal line is for minute adjustment of the telescope in elevation; the vertical line is for allowance for side wind, and the point of intersection by these two hair lines is the sight, which is thus most conveniently adjusted. Fixed hair lines are used in some of the American rifles. The telescope of Mr. Davidson is also capable of being elevated or depressed, by a joint at the eyepiece, and it is applied at the side of the barrel, instead of the top, as in American rifles.

The Hoosac Tunnel.

The great tunnel through the Hoosac mountain, which has been suspended for some time, is not to be given up. The *Commercial Bulletin* says respecting it:

"Under the act passed by the last Legislature, and the deed of surrender and conveyance to the State executed by the Troy & Greenfield Railroad Company, preparations are being made for the speedy prosecution of this important enterprise—this time we trust to its final completion. Workmen and machinery are being got in readiness for the purpose: an agent has been dispatched to Europe for models of an excavating apparatus (such, we believe, as is now in use in the great Alpine tunnel under Mont Cenis), and it is understood the best engineering skill to be had, here or elsewhere, will be put in requisition when the work is resumed. In regard to the work which has already been done outside the tunnel, the State Commissioners report that the line, as now located, is essentially a contractor's line, in which everything has apparently been sacrificed to save present outlay. All this will ultimately have to be changed, they say, and thus involve the necessity of doing much of the work over again.

"If the people of Massachusetts are to foot the bills for seven and a half or eight years more labor upon this 'big bore,' at an estimated cost of $5,719,330, they will require it to be done in a thorough manner, so that it may prove a real acquisition to the interests of commerce, and stand as a monument of American engineering skill. This can only be done by discarding the contract system as far as practicable, and by having the work executed under the immediate supervision of State agents."

Sleep.

Death from old age has been compared to falling asleep, never to awaken again in this world; and hence the transition is easy to a lucid consideration of the phenomena of sleep, "nature's soft nurse," so necessary to our existence. Death or madness must be the result of a long continued absence of this great restorer: so felt and said Byron in his last illness. Sir Benjamin Brodie mentions the case of a gentleman who, from intense anxiety, passed six entire days without sleep. At the end of this time he became affected with illusions of such a nature that it was necessary to place him in confinement. After some time he recovered perfectly. He had never shown any signs of mental derangement before, nor had any one of his family, and he has never been similarly affected since. Those who have been subjected to cruel tortures have declared that the most intolerable was the deprivation of sleep; and as this was one of the modes of treating the unhappy old women who fell into the hands of the witch-finders, it may account for some of their illusions, and the crazy confessions they made. The sick-nurse frequently has recourse to stimulants, which indeed remove for a time the uneasiness and languor occasioned by the want of sleep. But the temporary relief is dearly purchased, and those who have recourse to alcohol on such occasions, should know that it does not create nervous power, but only enables the recipients to use up that which is left, leaving them in more need of rest than ever, when the stimulus has ceased to act.

© 1863 SCIENTIFIC AMERICAN, INC.

Phenomena of Camphor in Water.

The following exceedingly interesting scientific gossip, respecting the peculiarities of camphor in water, is condensed from the London *Photographic News*:—

When small pieces of camphor are dropped on the surface of a glass of water several curious phenomena may be observed. They immediately commence to rotate, and move about with remarkable energy; varying sometimes in rapidity, but usually conducting their gyrations in a strange and erratic manner. In order to obtain the best effects, some precautions are necessary: thus, the camphor should be tolerably pure, the piece employed should be cut and separated from the larger lump with a perfectly clean instrument, and contact with the fingers should be scrupulously avoided. Moreover, the glass should be quite clean and the water pure. When these conditions are satisfied, the phenomena are really very striking, and well merit more attention than is generally devoted to such things. Several physicists have observed these curious motions of camphor; amongst others may be specially named Mr. Tomlinson and Mr. Lightfoot. The former gentleman has been attracted more to the physical phenomena involved in the movements, whilst Mr. Lightfoot has principally studied the chemistry of the subject. Each is of interest, but it is to some results recently found out in respect to the latter branch of inquiry that we desire at present to draw attention. If, instead of using a torn or cut fragment from a lump of camphor, one or two fine crystals are detached with a clean needle-point from the cork of a phial in which camphor is kept, and these are let fall on clean water, they at once begin to move about with wonderfully increased rapidity, darting away in various directions, as if shot from some miniature engine, or, endowed with life and a will of their own; each crystal quivering and rocking on the water with an apparent high degree of indignation at its forced contact with the humid surface. This fury gradually diminishes, and a regular dance begins; the various particles select partners, to some of which they will seem to cling with pertinacity; whilst others will either remain indifferent, or, if attracted, will only stay a very short time in embrace, and wander again in search of more congenial floating associates. The explanation which Mr. Lightfoot gives of these movements, is the emanation of a vapor from the volatile camphor, which has a very low tension; the water upon which it floats being capable of dissolving and diffusing this vapor more readily in certain directions of the crystalline axes, thereby removes sufficient vapor pressure at those points for the opposite side to drive about (by recoil) the nicely suspended particle. In certain positions two crystals of camphor will attract each other, whilst in other situations there is a mutual repulsion. It will sometimes happen that two crystals of camphor may be thrown on the water and not have any tendency to locomotion. When this is the case a continual trembling or vibration will be noticed in the crystal. When two such stationary vibrating crystals come in contact by attraction, immediately an eccentric, irregular change of place occurs, as if the force agitating each previous to the grouping, produced a new resultant force, in obedience to which the combined crystals move.

In describing the method of separating and placing the camphor on the water, we laid some stress on the fact that everything should be quite clean, and that the fingers should not touch the camphor in any stage. The reason of this is obvious. If, whilst camphor is actively moving on water, the most minute particle of certain greasy substances touch the water, instantaneously, as if by some magic, the camphor is deprived of all motion. The scene of previous activity is changed into immobility. This curious property has been made use of by Mr. Lightfoot to detect grease in quantities so extremely minute as would appear almost fabulous, for camphor cannot be made to rotate on water containing the most infinitesimal portion of grease. Mr. Lightfoot has made use of this test in a most ingenious manner, to distinguish between the two different methods of dyeing cloth with madder and with garancine. It is difficult and often impossible for calico-printers and merchants to distinguish between the two; and as the garancine dye is more fugitive than the first, and also of less intrinsic worth, it is sometimes substituted for it. There is, however, a slight difference in the process of manufacture—madder-dyed goods are, in one stage of the process, passed through a solution of soap to fix the color, whilst in garancine-dyed goods the soap is replaced by hypochlorite of lime. By proceeding as follows, it is easy to distinguish between the two kinds of dye:—Let camphor rotate on water in any glass vessel, as previously described, then immerse a small strip of the cloth to be tested. If the rotation stops, we infer the presence of soap, and conclude it to have been dyed with madder. But if, on plunging in the small piece of cloth, the rotation is not stopped, we then arrive at the conclusion that garancine was the dyeing material used. Before using the distilled water for any photographic purpose, it should always be tested by pouring a little into a wine glass, and then dropping a fragment of camphor on to the surface. The degree of purity of the liquid is at once shown by the energy of the movements of the camphor.

Light.

In analysing a ray of light, if the spectrum be divided into 360 parts, the red will occupy 45 parts; orange, 27; yellow, 48; green, 60; blue, 60; indigo, 40; violet, 80.

Light travels at the rate of 192,500 miles in a second of time, according to Herschel.

In the prismatic spectrum, violet rays indicate heat as 1, green as 4, yellow as 8 and red as 16. Beyond the red no peculiar action exists.

The colors of bodies depend upon the size of their atoms, and the chemical character of the local atmospheres of their atoms and interstices. Black has small atoms, and absorbs light; white large and reflects it. Reds are of oxygen character, according to Ellis; greens, nitrogen; and violet, hydrogen. Their minute parts decompose incident lights; absorb some, and reflect others; an oxygen body combining with hydrogen, and reflecting red; and the contrary with others; thus, a hydrogen atmosphere absorbs red, &c., and reflects blue and indigo, &c.; and a nitrogen absorbs red and violet, and reflects green or white, orange or blue.

The complementary colors are—for black, white; white, black; red, blue green; orange, blue; yellow, indigo; green, violet red; blue, orange red; indigo, orange yellow; violet, bluish green.

When the shadows of the same object projected on a wall by two lights are equally dark, the lights themselves are equally intense; but if not, the darkest shadow will be protected by the interruption of the brightest of the lights; and if this brightest light be then removed further from the wall, till both shadows become equally dark, and the distances of the lights from the wall be measured in that situation, the intensity of each will be in proportion to the square of its distance. For example, if two lights give shadows equally black or dark, when their distances from the wall are respectively five and seven feet, the intensity or quantity of light emitted from them will be respectively as 25 (or $5 + 5$) and 49 (or 7×7).

Bodies which refract most reflect most, or are more splendid. The local atmosphere which increases one increases the other.

Reflection is in intensity as difference of refractive power in the media.

The full moon produces no heat.

The optic nerve enters the eye .11 of an inch from the axis of the eye, on the nasal side; the axis is .91.

Angle of vision taken in by the fixed eye, 110 degrees.

Impressions on the eye are permanently continuous which are repeated 7 times in a second. When the sea is a blue color, it is deep water; and when green shallow. The film of a soap bubble about to burst is only about three-fourths of the millionth of an inch in thickness.

NEW INFERNAL MACHINE.—The rebels recently floated some new infernal machines down upon our vessels in Charleston harbor with the design of blowing them up. The following is a description of the torpedoes:—Three oval metallic cases filled with powder are fastened together by wires; upon these cases there are nipples for percussion caps, the caps being covered with gutta percha; above this there are a series of hammers, delicately set, so that by coming in contact with a ship they would be liberated, and discharge the contents of the case. These machines were all discovered in time to prevent any damage from them.

Accidents from the Use of Steam.

The following letter from a correspondent of the London *Times*, embodies sound common sense, and practical knowledge: two indispensables in commenting and deciding upon the cause of boiler explosions:—

Every one must have been struck with the frequent record in your columns of steam boiler explosions; but they only who have witnessed their effects can form an adequate conception of the havoc which they occasion. It has fallen to my lot to visit the scene shortly after the occurrence of three of these terrific accidents, and my pen is powerless to describe what I beheld. I have seen the devastation presented in one of the strongest fortresses in Europe shortly after its reduction by siege, and I have often been the spectator of experiments with the stupendous artillery of modern times; but I have no hesitation in declaring that steam, as an agent of destruction, has astonished and impressed me not less vividly than gunpowder. Imagine a boiler of tough wrought iron, 30 feet or 40 feet long, rent as though it were made of tissue paper, torn from its solid bed, and scattered in huge fragments far and wide, red hot bricks sent flying in all directions through the air, thick walls knocked down, roofs crushed in, buildings strong enough to have endured for ages ruined in a moment, and human beings, full of life and vigor, blown headless, armless and legless, like chaff before the wind. This, sir, is not a highly-colored description, written with a view to a "sensation effect," but a fair and simple statement of what has often occurred.

I have performed the wearisome work of wading through numerous records of boiler explosions which have been published in France, in the United States and in Great Britain; and I therefore venture, with your permission, to state in as few words as possible, the impression produced on my mind by this investigation. I do not propose to submit to you specific evidence, as that would require an amount of space in your columns which it would be unreasonable to expect at this season. My impression then is that, not only in the majority, but in the great majority of instances, the accidents were wholly preventible, and would not have taken place if the most ordinary precautions had not been neglected. The causes which have been assigned for boiler explosions are very varied, and some of them have not the slightest foundation. Gross carelessness, and working the boiler after it has become fairly worn out, seem to be the chief.

You are, sir, no doubt aware that an "Association, for the Prevention of Steam Boiler Explosions" has existed in Manchester during many years, and the results have been most satisfactory. The boilers of members of this institution who pay an annual subscription are regularly inspected by competent persons. The following important extract is from the report of 1861, by Mr. Lavington E. Fletcher, chief engineer:—

"I found that due care and periodical inspection with the application, where necessary, of the hydraulic test, would have prevented every one of these explosions, and thus that the word 'accident' could not be applied to any one of them. I meet every day with increasing evidence that the mystery in which boiler explosions are often shrouded should be dispelled, and consider that, by due attention to correct principles in the construction of boilers in the first place, and by care in their working in the second, the recurrence of the explosions would be prevented."

The Manchester people have voluntarily organized an effective system of inspection, such as is now sought from the Government with reference to all steam boilers. Although I will not venture to express an opinion on the expediency of requesting the Government to undertake this somewhat paternal duty, yet, before we do so, I think, sir, you will agree with me that we ought, at least, to try what we can do for ourselves. The Manchester people have set the example, and shown us how much may be done without official, or, as it is too apt to become, officious inspection.

© 1863 SCIENTIFIC AMERICAN, INC.

Correspondence

Obstructing the Hudson River.

Messrs. Editors:—I noticed on page 89, current volume of the Scientific American, an article on "Improving navigable rivers," which reminded me of a subject I thought of bringing before the public. It is to prevent sand and earth from being carried into navigable rivers, and thus keep them navigable without the necessity of employing dredging machines. The banks of rivers may be protected with walls; but this will not prevent great quantities of earth and sand from being carried into them by creeks, during freshets. Perhaps the greatest deposits of mud which find their way into rivers, are carried thither by creeks. While building a house recently, in Washington county, N. Y., I noticed a place nearly opposite Schuylerville, a short distance from the river, where millions of loads of sand had been washed away; and millions more will probably go in the same direction. On the banks of the Wyantskill (a creek which empties into the Hudson, near Troy, N. Y.), immense quantities of sand have also been washed out, lately, and carried down into the river. In several places, hills of gravel and sand, which were formerly covered with forest, or grass, have recently had their sides exposed, by cutting roads, &c., through them; and as a consequence, every rainstorm washes down large quantities of gravel and sand therefrom into the creek. Some system should be adopted for preventing such obstructions to navigation from being carried into navigable rivers.

M.

West Sandlake, N. Y., Aug. 20, 1863.

Concerning Milk.

Messrs. Editors:—In the Scientific American of Aug. 22d, I notice an article on a curious custom prevailing among the milkmen of Mexico, in driving their herds about the streets and milking them to order. When in Paris last season with an invalid friend, we had asses milk prescribed, to be taken fresh from the animal, and, early in the morning, about six o'clock, tinkling bells announcing their approach, the sleek and beautiful she-asses appeared, and the milk required was drawn before the patient's eyes. I was gratified with this method of furnishing the pure milk. It was to be seen every morning in Paris, in the most fashionable promenades as well as the ordinary streets; where pure milk could be obtained without any possibility of the adulteration which prevails in all our cities. It may not be practicable to introduce this system generally; but to the invalid, and the little ones who are now slaughtered by thousands by the vile admixtures which are furnished, what a relief it would be, if this Parisian custom could be introduced among us! I beg of you, dont discourage any effort that will give us pure milk.

[On the contrary we should be glad to see the sale of all adulterations of this prime necessity of life reduced rapidly. There is no hope for a radical reform in this respect, except in the intelligence and good sense of our citizens. Fresh, sweet, and pure country milk can be had in this city in any quantity; and those persons who drink swill milk do so from choice, and not compulsion.—Eds.

Packing for Piston and other Rods.

Messrs. Editors:—A short time since I noticed in your valuable journal an engraving of a metallic packing for piston rods, etc., the accompanying article on which expressed the great trouble to which engineers were frequently put in endeavoring to prevent the escape of steam from the stuffing boxes.

Up to March, 1862, I had experienced like difficulties. I then packed my piston rod with Martin's patent metallic packing, which remained perfectly steam tight up to the 4th of July, 1863. About the middle of March, 1862, I also packed my valve stems with this material, which lasted for six months without giving any trouble. It has also worked about the same in other engines in this vicinity.

The packing on the piston rod cost $3.30—being a fraction over 20½ cents per month. The engine is a forty horse horizontal, working at about 80 pounds pressure. Should any of your engineering correspondents have used packing of greater durability and cheapness, I should be glad to hear of it.

I have no interest in the sale of the article, but write this in the hope of lessening the trouble and anxiety of some brother engineers, and also influenced by your able and very commendable endeavors to spread, broadcast, information valuable to employers and employed: aiming alike to promote the interest and elevation of both. If you consider my testimony worthy of insertion in your journal my object will be accomplished.

The inventor and manufacturer of this packing is Richard Martin, 8 Water St., Brooklyn, L. I. I have often wondered why he does not advertise it in the Scientific American; he would certainly increase his business tenfold, if not more.

Joseph C. Eaton,
Engineer at J. S. & E. A. Abbot's Coach Manfy.
Concord, N. H., Aug. 15.

Guano Deposits on the Coast of Peru.

An important survey has lately been concluded, of guano deposits on the coast of Peru. The engineers commenced at the Lobos Islands, where, in their opinion, were the more valuable deposits. The guano on these islands extends on a large part of the surface, to a depth of ten or twelve feet; but on some parts there are deposits of as much as forty feet deep. On both islands the first-class guano may be calculated about three millions of tuns, and the one of the second-class, about one million of tuns. For the first-class guano, Peru can easily obtain a net produce of $30 a ton. Of the second-class, the net produce will not be less than $20 a ton. After these islands were explored, the Peruvian engineers sailed for the Macabi group, near Malabrigo; but on board they had such a poor opinion of these deposits, that nobody thought of staying there any longer than two days. When they landed, however, they were surprised to find a respectable stock—the whole guano of the first class, and not inferior at all to that of the Chincha islands. In the exploration of these islands, which are two, a large and a small one, the labors of the engineers were interrupted, because the borer they used for their examinations broke, after having penetrated, with great effort, to the depth of 130 feet, without touching the foundation rock. On these islands all the guano is of first quality, and the said stock is not less than 1,500,000 tons. The work having been suspended after this accident, the vessel sailed for the Guanape group, opposite the point of St. Helena. All the guano on these islands was found to be of the first class; and the stock, judging by the height and the extension of the deposits, which commence at the very sea, will not be less than 2,000,000 tons. The minimum of these deposits may be represented at 8,000,000 tons.

The Old and New Times.

How much happiness, time, and temper have been saved to mankind by the inventor of lucifer matches; and yet his name is unknown. What intolerable bores must have been the flint and steel! When the wise and witty Sydney Smith was in his seventy-third year, he amused himself by writing out a list, which will be found in his memoir, of eighteen important changes which had taken place in England. In the first place, when he was a middle-aged man, gas was unknown; and he says he has "groped about in the all but utter darkness of a twinkling oil lamp, under the protection of watchmen in their grand climacteric, and exposed to every species of degradation and insult." He was nine hours sailing from Dover to Calais; nine hours riding from Taunton to Bath; in which he says, with an exaggerative wit, "he suffered from 10,000 to 12,000 severe contusions, before stone-breaking Macadam was born." He had no umbrella when it rained; and poor Jonas Hanway, who first introduced umbrellas, was finely persecuted and mocked for his courage. There were no quick and excellent cabs running; if he wanted to go beyond walking distance, he must fain get into "one of those cottages on wheels, a hackney coach"—of which there is now only one existing in London. But those hackney coaches were themselves a modern improvement. If, in the days of the youth of the witty writer we have quoted, he travelled to certain parts of the kingdom, he went in a slow waggon, as he was poor; he must otherwise go in the basket of a stage-coach, where his clothes were rubbed all to pieces. In even the very best of society, he says, "one-third of the gentlemen were always drunk." There was besides hardly an easy chair or a well-made sofa in the kingdom. Huge bedsteads harbored vermin, badly-made windows excluded light, and ventilation was an undiscovered science. "Positively," writes the canon of St. Paul's, "I could not keep my small clothes in their proper place, for braces were unknown." If a man had the gout, there was no colchicum; when smallpox was about there was no vaccination; and people, who had lost their sight and their beauty from that scourge were met at every step. The doctors were ignorant; and, to make matters worse, there was no proper examination or restriction; consequently quacks abounded. There was no penny post, and no bank to receive the savings of the poor. "In spite of all these privations," wrote Sydney, "I lived on quietly, and am now utterly ashamed that I was not more discontented, and utterly surprised that all these changes and inventions did not occur two centuries before." In spite of all their shortcomings in comfort, the old times were often great times, producing noble and great men, who spent their lives for the good of their fellow creatures. The majority of modern improvements may be and are little things; but these "little things are dear to man." They permit him to act more freely; they are so many stumbling blocks taken out of the way of general advancement.

Chrome for Photography.

A chrome green of great beauty is prepared as follows, according to M. Guignet, the French chemist:—

Take a mixture of three parts of boracic acid and one part of bichromate of potash, calcined at a temperature of about 300°, centigrade. An evolution of water and oxygen gas is observed, and there is formed a double borate of sesquioxide of chromium and potash. This salt, which is stable at the ordinary temperature, is decomposed by water, giving biborate of potash and sesquioxide of chromium. The latter body in the nascent state combines with water and forms a hydrated sesquioxide of a remarkably fine color. This is separated from the biborate of potash by decantation and washing, and the remaining chrome green is allowed to dry at the ordinary temperature. The pigment is being largely used among artists on account of its beauty and brilliancy. The color is very solid, and it has the valuable property of looking equally beautiful by gas or candlelight as it does by daylight—the green color not changing to blue as is the case with many pigments. Sesquioxide of chromium may also be obtained in a very curious form by the decomposition of bichromate of ammonia. A quantity of crystallized chromic acid is dissolved in water and divided into two equal parts; one portion is then neutralized with ammonia, the other portion added, and the whole evaporated over oil of vitriol. When the solution becomes sufficiently strong, the bichromate of ammonia separates in the form of large cherry-red crystals, which are collected by decantation, drained on bibulous paper, and dried at a gentle heat. On exposing a small portion of this salt to the heat of a spirit lamp in a platinum dish, a very energetic action takes place, accompanied by strong incandescence, and green bulky masses of chromic oxide shoot out in every direction, exactly resembling ordinary dried green tea leaves. Sesquioxide of chromium possesses another property which renders it of interest to photographers. After it has been ignited it may be considered as being practically unaffected by any chemical reagent. It is, on this account, of the greatest value for coloring paper pulp from which legal documents are to be made. The green tint of the paper renders them incapable of being copied photographically, whilst the unalterability of the sesquioxide of chromium prevents the paper from being bleached by chemical means before taking the photograph. There is only one objection to paper tinted in this manner. The oxide of chromium is so intensely hard that it rapidly wears away the pens employed for writing on paper tinted with it.

© 1863 SCIENTIFIC AMERICAN, INC.

Antidotes of Poisons.

Toxicology is one of the most delicate parts of medical chemistry; and, to analyze the contents of the stomach, or to pronounce positively whether it contains or does not contain poison, not only a considerable knowledge of chemistry, but also considerable practice in manipulation is required. But when the poison administered is known, the following list of ordinary antidotes, placed after the poisons, may be used with good results. The substances mentioned should be immediately given in solution, and the stomach pump or an emetic of white vitriol, or ipecacuanha, employed to evacuate the stomach and bring away the poison as soon as possible :—

Acid, hydrochloric(or muriatic), *nitric*(or aquafortis), *oxalic* (salt of lemons, often mistaken for Epsom salts)—Magnesia made into a paste with water; solution of soap.

Acid, hydrocyanic (or prussic)—Cold effusion of diluted ammonia.

Antimony, tartar emetic—Administer large doses of warm water to induce vomiting; give the powder of Peruvian bark, and, as soon as it can be prepared, the infusion of bark, which decomposes the tartar emetic.

Arsenic (the white oxide)—The hydrated tritoxide of iron in a dose thirty times greater than that of the poison.

Baryta (the oxide, the muriate, and the carbonate)—Sulphate of magnesia (Epsom salts), sulphate of soda (Glauber's salts), or any alkaline or earthy sulphate.

Cantharides—Emetics, if required, demulcents, leeches, and bleeding. Sir Benjamin Brodie states that, where strangury was produced by a blister, goldbeater's leaf laid on the plaster, obviated this inconvenience, without preventing the usual action of the cantharides; a fact which has been confirmed by experience.

Poisonous fungi (mushrooms)—Emetics; no antidote is known.

Sulphuretted hydrogen—Free exposure in the air.

Carbonic acid (in brewers' vats, &c.)—Fumes of burning charcoal, and free exposure in the air.

Copper.—Blue vitriol and verdigris (sulphate and acetates of copper)—White of eggs, iron filings, and ferrocyanate of potassium in solution.

Lead.—Litharge, red lead, white lead, sugar of lead, and Goulard's extract. In the first stage, or the irritant form of injury, administer sulphate of magnesia, potash or soda. The phosphate of soda is a good antidote. When palsy supervenes, the regimen must be regulated carefully.

Mercury, the bichloride (corrosive sublimate)—Give white of egg diluted in water; or milk, if eggs cannot be obtained.

Strychnia and *Nux vomica*—Evacuate the stomach with the stomach pump, or emetics. No antidote is known.

Opium, Laudanum.—Emetics of the sulphate of zinc (half a drachm, or two scruples), the stomach pump or injections of tartar emetic, must be employed to bring away the poison. The patient should be constantly roused by dragging about the floor, throwing cold water in the face, and giving ammonia, assafetida, &c. Bleeding is sometimes required.

Zinc, sulphate (white vitriol)—Potass in syrup; also cream, butter, and chalk. Give water after the antidotes.

Curiosities of the Draft.

The scenes at the Provost-Marshal's offices in Philadelphia were sometimes amusing. The *North American* says :—

"Experience shows the fact that the two infirmities most common among men in cities are hemorrhoids (piles) and rupture in its various forms. On account of these two affections, fully three-fourths of the applicants for exemption receive their discharge. Rupture is an affection that is in its very nature incurable. Its effects may be palliated, but a ruptured man could not possibly perform a soldier's duty. Very bad cases of hemorrhoids are equally disqualificatory for military service.

"In examining substitutes the most rigid scrutiny is exercised. Many attempts at fraud are made. Men unfit for service sell themselves as substitutes, foolishly supposing themselves able to conceal their infirmities. They little know the ordeal through which they must pass. They entirely overlook the fact that a surgeon, in five minutes, can overhaul them as a watchmaker overhauls a watch. There are abundant attempts at fraud all round. Drafted men claim disqualification on the ground of disability, and men who want substitute money endeavor to conceal their ailments. Both call into practice the utmost skill of the surgeon making the examination.

"The substitute, upon presenting himself for acceptance, is taken into a room, where he disrobes himself. The surgeon begins with his teeth, and examines his whole body down to his toes. The examination is even more searching than the examination of an applicant for a policy of insurance upon his life by a life insurance company's surgeon. If the front teeth are gone, so that the man cannot bite off a cartridge paper, he cannot be accepted for infantry service. He may do for a trooper. Every limb is examined. If the lungs are unsound, the temperament apoplectic, or the system wasting, the Government does not want the man, either as a volunteer, a conscript or a substitute.

"The applicant is made to throw himself into various attitudes. His toes and fingers must be practically perfect. He is made to pick up a grain of corn from the ground without bending his knees; to stand upon the points of his toes, and to show that he is perfect in his anatomy. If he stands this test he is accepted, and a release is given to the man who brings him. The substitute then receives his money, and is given into the custody of a guard. He is then a United States soldier for three years.

"A little man claimed to be ruptured. The removal of his clothing disclosed a truss with pads about as big as tea saucers, large enough to cover a first-class rupture upon the Belgian giant. The doctor could find no sign of any rupture, but as a rupture sometimes descends or recedes, the man was told to sit down for a while. In half an hour, if it existed, it would be perceptible. The man sat down, in *puris naturabilis*, upon a chair, trembling like a leaf. But the rupture didn't show itself. The surgeon said that if he could bring a respectable medical certificate of rupture existing, it should have due weight. The man left, saying he would get it. He appeared honest.

"Out of about thirty whom we thus saw examined, more than a dozen were badly ruptured: a fact which shows that dealers in trusses do a lively business. One fellow had voluntarily relinquished his front teeth to escape conscription. To his unutterable dismay he was accepted for cavalry service. When he found himself caught, his knees smote together, and his face paled to the whiteness of the paper on which the surgeon wrote his name and condition. He was in splendid health. The gums from which the sound teeth had been violently drawn had not yet receded into position. Very few colored men apply for release. When drawn, they go or else bring substitutes, and few of them do this."

Propagation of Fungi.

It is a physiological axiom that the simpler and smaller an organism, the more bountifully is it furnished with the means of propagating itself. Exposed to numerous contingencies, to extremes of temperature, to excessive drought, alternated by excessive moisture, failure of reproduction by one method must be compensated by the development of another, which shall answer the purpose in view even in the most unfavorable circumstances. Accordingly, plants of this class are provided with two, three, and, in some cases, even with four modifications of reproductive power, all equally effectual, though not all developed at one and the same time. They may multiply themselves by means of the spawn or mycelium, by self-division or lamination, which may be regarded as a species of germination or budding, or they may be propagated by seeds or their equivalents, produced in special receptacles. Every cell or tissue may contain its germs, and each germ springs up into new forms equally fitted for propagation in the space of a few hours; nay, some may pass through the course of their existence in a few minutes, and give birth to thousands even while under the field of the microscope. In truth, the common productive bodies called spores or seeds do not directly propagate the fungus. They germinate, however, at definite points, and after a time produce threads or filaments which throw out secondary and even tertiary spores, which are the true organs of reproduction, and whose minute size and greater profusion render them more serviceable in the economy of the plant.

The number of germs, or other reproductive bodies which parasitic fungi produce is incalculable, almost infinite. It has been ascertained that one grain of the black matter which fills up the ear of corn in smut, contains upwards of four millions of spores or seed-vessels, which are again filled with sporules or seeds so infinitesimally minute and impalpable, that no definite forms can be distinguished by the highest powers of the microscope. When a seed-vessel is ruptured, they are seen to escape in the form of an airy cloud, filmy as the most delicate gossamer; and on a fine summer day, a keen-sighted observer may behold them rising from diseased heads of growing grain into the air, by evaporation, like an ethereal smoke, dispersing in innumerable ways, by the attraction of the sun, by insects, by currents of wind, by electricity, or by adhesion. The atmosphere is freighted to an inconceivable extent with such germs, quick with life and ready to alight and spring up. So tenacious are they of vitality, that neither summer's heat nor winter's frost can destroy them; and they are capable of germinating after the longest periods of hybernation. Furnished with such powers of endurance and dispersion as these, it is a fortunate circumstance that they require peculiar atmospheric and other conditions for their growth; and when these are absent, they will not develope themselves or spread; otherwise the whole world would be speedily overrun with them; the "fig-tree would not blossom, and there would be no fruit on the vine; the labor of the olive would fail, and the fields would yield no meat."

Bird-catching Spider.

H. W. Bates, an English naturalist, has lately published an account of his adventures in the region of the river Amazon. The following is his account of a bird-catching spider, which he saw at Cameta, in the Province of Para :—

"The species was M. avicularia, or one very closely allied to it. The individual was nearly two inches in length of body, but the legs expanded seven inches, and the entire body and legs were covered with coarse gray and reddish hairs. I was attracted by a movement of the monster on a tree trunk; it was close beneath a deep crevice in the tree, across which was stretched a dense white web. The lower part of the web was broken, and two small birds, finches, were entangled in the pieces; they were about the size of the English siskin, and I judged the two to be male and female. One of them was quite dead; the other lay under the body of the spider not quite dead, and was smeared with the filthy liquor or saliva exuded by the monster.

"I drove away the spider and took the birds; but the second one soon died. The fact of species of Mygale sallying forth at night, mounting trees and sucking the eggs and young of humming birds, has been recorded long ago by Madame Merian and Palisot de Beauvois; but in the absence of any confirmation it has come to be discredited.

"The Mygales are quite common insects; some species make their cells under stones, others form artistic tunnels in the earth, and some build their dens in the thatch of houses. The natives call them Aranhas caranguejeiras, or crab-spiders. The hairs with which they are clothed come off when touched, and cause a peculiar and almost maddening irritation. The first specimen that I killed and prepared was handled incautiously, and I suffered terribly for three days afterward. I think this is not owing to any poisonous quality residing in the hairs, but to their being short and hard, and thus getting into the fine creases of the skin. Some Mygales are of immense size. One day I saw the children, belonging to an Indian family who collected for me, with one of these monsters secured by a cord round its waist, by which they were leading it about the house as they would a dog."

In our notice recently of Harris's Improvement in Steam Boilers, the name of the inventor should have been stated as R. S. Harris. See paper of Aug. 8, 1863.

© 1863 SCIENTIFIC AMERICAN, INC.

Improved Adding Machine.

In all business transactions figures are indisputable; and as the magnitude of the operations increases, to ascertain the correct amounts of the several sums added is of the first importance; this is ordinarily done by the well-known rule, which, however, is comparatively slow (depending upon the ability of the accountant), and always tedious. In order to facilitate the adding of many numbers, machines have been invented, which, depending upon absolute mechanical motions and changes, produce the result of a sum much quicker than it could be done mentally. Such an one is herewith illustrated. It is eminently convenient, light, portable; has no machinery whatever about it, and is always accurate—the last is of course the principal feature.

It has been remarked in many cases that "figures can't lie," but experience proves that this maxim, like some others, is more trite than true. The very best accountants will, at times, commit serious errors, which result in much future trouble; but with this tablet the result can always be warranted correct, provided the directions on the machine are observed in working it. Simplifying and shortening the vexatious process of adding sums, will be, or should be, welcomed cordially by all persons who have occasion to use figures; and the adoption of this adding tablet will tend materially to the result set forth. Very many eminent business firms in this city and elsewhere testify to its usefulness, and acknowledge the value of it in economizing time. The apparatus itself is merely a handsomely finished wooden tablet, as shown in Fig. 1, having brass slides, A, let into grooves in its face. These slides have small holes in them, opposite the numerals on the tablet itself, in which a pencil is to be inserted for the purpose of moving the slide back and forth to perform the operation. On the back of these strips there is another set of figures, which can be read through the countersunk holes, C (Figs. 2 and 3); small spring, *a*, under the slide keeps it snugly against the metallic cap, B, on either end of the tablet, so that the slides cannot move spontaneously, or at any time except at the will of the operator.

This is, in brief, the whole machine, and it will be easily seen that it comprises the features most desirable in such an apparatus; being readily operated by any one, having no complicated parts to disarrange, and afforded at a low price. These qualities, together with its accuracy, should render it one of the most popular inventions of this class. Patented through the Scientific American Patent Agency, on July 14, 1863, by Mr. George B. Fowler. Further information can be had by addressing G. B. Fowler & Co., Box 3,213, Chicago, Ill., or George B. Fowler at Rice & Co.'s, 37 Park Row, New York.

Fig. 1

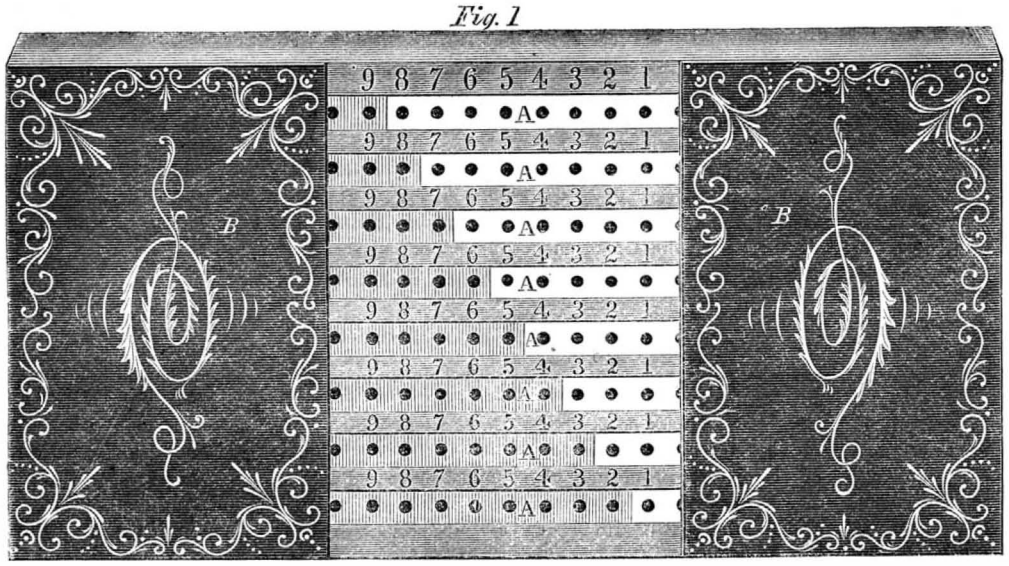
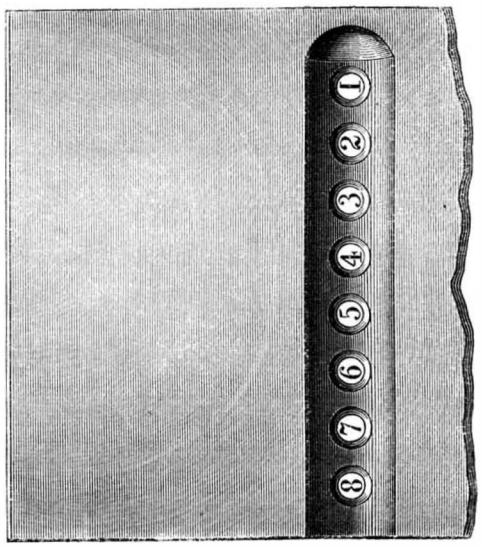


Fig. 2

Fig. 3

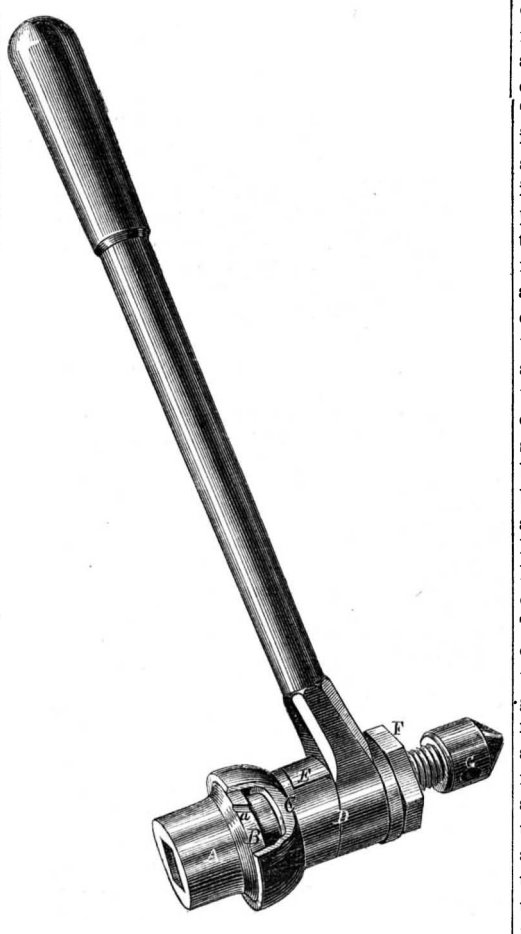


FOWLER'S PATENT ADDING MACHINE.

Jointed Steamships.—Experiments have been recently made in England with a new iron steamship, built in sections and connected by strong working joints. Any one of these sections can be disconnected from the other, and when so separated can be left at any point and loaded, while the rest of the vessel goes after cargo at a distant point. The experiments are said to be a success; but it is a puzzle to us to see how the section containing the machinery preserves its stability when disconnected from the rest. Similar boats are used on our canals, to convey coal to and from the large cities; but we never heard of any steamships built in this manner, nor do we see the utility of them. It is stated that, tried in a sea way, the plan worked well, and the *Illustrated News* has an engraving representing this kind of ship straddling the waves in the most terrific manner.

INGERSOLL'S PATENT FRICTION WRENCH.

For drilling holes in massive castings, in work which cannot be moved under a drilling machine, or for perforating plates in places almost inaccessible, there is no tool more useful than the common pall wrench. This is to be found in every machine shop, in all stages of worth and worthlessness; from the old worn out affair with three teeth and no spring, to the brand new one, so stiff that it takes a man's strength to pull it around. We have inspected a great many different sorts of pall wrenches in our time, some of which have been improvements upon the old style commonly used, while others have not. The wrench illustrated in the accompanying engraving commends itself to us, especially by reason of its simplicity, its efficiency and durability; all cardinal virtues in a tool of this class, that has to encounter so much rough usage. In the ordinary wrench it is well known that the handle must move a certain distance, far enough to take one tooth, before the drill can be turned, and that in some situations this feature becomes a serious objection—the longer the handle the greater the difficulty. Particularly in drilling large holes is this trouble manifested; for then the handle must be shortened, and the power of the lever is lost. This wrench is liable to no such objection, and the drill can be moved any distance required, either a portion, or half of its revolution, as may be necessary. This assertion will be fully understood by referring to the description of the tool. The socket, A, has a bevelled flange, B, turned on its exterior, to which is accurately fitted, at a certain angle, the cup, C; the upper part of this cup which is broken out to show the interior, has an inclined plane, D, worked on it, and is further furnished with the shoulder, E. The handle of the wrench is in all respects a counterpart of the upper end of the cup, and fits it as a coupling does a clutch. In the upper end of the drill socket, which is continued through the wrench, there is a thread cut which is fitted with a nut, F; this nut has a round shoulder which sets up against the handle, and regulates the bite of the cup against the bevelled flange. The object of the screw, G, is to feed the drill up to its work. It will be seen that, by turning the handle, the cup is forced by the inclined plane hard down upon the drill socket, and consequently turns the drill; on the return the handle runs upon the plane, releases the cup, and lets it turn freely, so as to renew the stroke; this operation is kept up until the hole is finished. The small channel, *a*, in the flange, allows any dirt or grit that may work in, to be thrown out; so that the friction surfaces may be at all times clean and in good order for work; there are three of these channels. The advantages of this wrench are many, and apparent to all who have occasion to use it. It cannot get out of order with decent usage, can be made as strong as required, takes up very little room on the work—much less than the ordinary wrench—and is perfectly noiseless. This last feature is an extraordinary one. If it proves on trial all it appears to be in the office, it will be one of the best wrenches we have ever seen; the principle is certainly a good one. Patented by S. Ingersoll, May 12, 1863; for further information address the manufacturers, Betts & Ingersoll, Stamford, Conn.



© 1863 SCIENTIFIC AMERICAN, INC.

The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Three Dollars per annum—One Dollar in advance, for our months.
Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
☞ See Prospectus on last page. No traveling agents employed.

VOL. IX, NO. 10...[NEW SERIES.].....*Nineteenth Year.*

NEW YORK, SATURDAY, SEPTEMBER 5, 1863.

THE LAWS OF STORMS.

Two laws or modes of operation seem to govern storms. One is the law of progression, according to which every storm travels along a certain track towards the nearest Pole; and the other is the law of rotation, according to which every storm is an aerial eddy, or whirlwind. As a great whirlwind may be revolving so slowly that the wind produced by it will vary from a gentle breeze to a gale, the term *cyclone* has been adopted for it. Some of these cyclones are exceedingly destructive. In July, 1773, one visited France, and destroyed the crops in 1030 parishes. All the storms that have ever been traced in the middle latitudes of the Northern hemisphere travel east-northward. The cyclones of the North Atlantic ocean arise in the Gulf of Mexico, about 10° from the Equator, and travel at first northwestward, throughout the Gulf; then re-curve, sweep along the coasts of the United States, and cross the Atlantic ocean, towards Europe, in a northeasterly direction. All the great West India hurricanes on record, and most of the great Atlantic storms have been carefully examined, and their paths mapped out; and all confirm the two laws enunciated. In the South Pacific Ocean investigations have also been made respecting the character of the storms which prevail there, and these have also been found to be cyclones, but moving in a different direction to those in the northern hemisphere.

These laws were first announced by Colonel Capper, in 1801, in a work on winds and monsoons; but the late W. C. Redfield, of New York, was the first person who fully investigated the question, collected reliable data, and published convincing proofs of his views, in the *American Journal of Science*, in 1831. About this time Major Reid, of the British Army, was also investigating the same subject, while residing in the West Indies; and Mr. Redfield's paper having come to his notice, he said, "it was the first publication he had met with which appeared to convey any just opinion on the subject of hurricanes." Mr. Redfield traced and mapped a cyclone, which, in October 1846, passed through Honduras, Cuba, and extended beyond Newfoundland—a distance of over 3,000 miles. In December of the same year, one was traced from Arkansas, across New Jersey into the Atlantic; and another from Wisconsin, through Lake Ontario, into the Gulf of St. Lawrence. The width of these was usually limited to from a hundred to a hundred and fifty miles; but strange to relate, the places of the beginning and ending of these storms were undetermined. Near the center of cyclones the aerial current sometimes moves with terrific velocity, and they therefore are very dangerous to vessels at sea caught in their whirls. Their approach is indicated by a great fall of the mercury in the barometer; but an inexperienced navigator may be carried around in one as in a whirlpool, for want of knowledge to guide his bark in the safest course. The clipper *Charles Heddle*, cited by Mr. Redfield, sailing from Mauritius to Muscat, was caught by a hurricane and carried round and round in it for 117 hours. Hurricanes occur most frequently on the Atlantic Ocean in the months of August and September; but they are not confined to any month of the year.

The island of Mauritius lies directly in the hurricane track, and being a most favorable situation for observing these, the Government of France has done much for the cause of science in erecting an observatory there. It has been asserted by Mr. Bosquet, of this observatory, that he can predict the approach of a hurricane and determine the course it will take. The barometer, he states, is affected by an advance aerial wave, which causes it to stand higher than usual; and this inequality of atmospheric pressure causes the mercury to oscillate for a period amounting to about 24 hours in advance of the hurricane.

The Gulf cyclones spend much of their force before they reach the Northern States; but they are very dangerous to coasting vessels. Mr. Redfield first suggested that the telegraph should be employed to give notice of their occurrence, and a coast line of telegraph would undoubtedly be valuable to vessels in port, in giving them warning of approaching danger. The cause of such storms is yet a mystery. It has been asserted by some persons who have expressed opinions on this subject, that they are caused by volcanic eruptions, and electricity; but when asked for an explanation of the mode by which these agencies produce them, they have been incapable of giving a satisfactory answer. It is an undoubted fact that the Gulf of Mexico is the great cauldron whence originate most of the storms that visit the United States and British North America. All our thunderstorms appear to come from it, as the result of great solar evaporation. As intense charges of electricity are developed by the escape of steam from a boiler, through a proper frictional orifice, so the moisture generated in the Gulf of Mexico, carried along by the prevailing westerly aerial currents, seems to generate our electrical atmospheric storms, upon precisely the same principles. This is a subject, however, which is still obscure in many of its features, and it presents boundless scope for observation and reflection.

INADEQUATE MEANS OF ESCAPE FROM FIRE.

The recent terrible disaster at Cohoes, N. Y., where some twenty unfortunate females were burned to death, or suffered such injuries that they died in consequence, awakens public interest anew to the condition of factories generally, as regards the means of escape from fire they afford. If we reflect upon the subject, we shall find that, in nearly all cases, the factories most liable to accidents of this kind are worked by women—the most helpless of beings in time of danger. Cotton mills, shops where cartridges are made, and fireworks of all descriptions: these are the occupations which females seek, as best adapted to their strength and capacity. In the latter class of employments no fire-escape can avail when an explosion takes place; but in the cotton factories of the several States, North, East and West, there are at this moment thousands of precious human lives at the mercy of the first flame that accident or design may spring upon them. It does seem as though some extraordinary provision should be made to meet the necessities of the case. We are aware that lengths of hose are kept stretched in the most extensive works, and that pumps are at hand which would ordinarily flood the building; but these are not all that is required; for while the fires are being subdued, hundreds may perish; and a suitable regard for life and limb should induce corporate bodies to consider whether some additional precaution is not required for the safety of their employes. Let them construct staircases outside of the building, as is done in the large factories abroad, so that the flight or exit of a struggling, panic-stricken crowd of women would not be impeded, or their retreat cut off by a loss of the usual mode of egress. As the case now stands, their safety depends very much upon contingencies, whether the pumps work or not, and whether those imperilled retain presence of mind enough to move orderly and quietly. The exhibition of this latter trait of character is an extremely rare one, and no reliance can be placed upon its manifestation.

While the above remarks are true of factories, they are none the less so of other buildings. Churches, school-houses, public halls, theaters, &c., all require to be remodelled. Perhaps once in ten years there occurs a holocaust of human life, wherein numbers of individuals are burned alive and others trampled to death. The fact is that we build large public edifices like fly traps, very easy to get into, but impossible to get out of, should occasion demand the utmost expedition. Every day large public buildings are being erected all over the land; but we cannot observe, among the glowing descriptions of their architectural beauty, that extraordinary provision is made against fire. This feature is at least of as much importance as any other point, ventilation not excepted; and public interest and private weal demand that a radical change be made in this respect.

CONGRESS OF MECHANICAL ENGINEERS—IRON SHIPS.

The Annual Congress of British Mechanical Engineers was held at Liverpool, during the first week of August, and was attended by a large number of distinguished mechanics—the chair being occupied by Mr. William Clay, in the absence of the president, Robert Napier, of Glasgow. The first paper read was by John Vernon, of Liverpool, on the construction of iron ships. As iron is now employed so extensively in the new steamers which are being built for our navy, and as it will yet take the place of timber to a large extent in our merchant steamers, every item of information obtained from a practical iron ship-builder—like Mr. Vernon—is of importance. The following is a brief abstract of his paper:—

The first consideration is the main points of superiority in iron over wood. These consist in its greater strength and durability, and in the greater carrying capacity of iron vessels over those of wood. Iron affords facilities for obtaining the necessary strength in the keel, stern, stern-posts and screw-port frames, by the introduction of large forgings. Of this, as well as of the power of iron ships to resist damage in case of stranding, the *Great Britain* steamship was an instance. She lay stranded in Dundrum Bay for nearly twelve months without suffering material damage. The best built wooden ship would have been ruined under the same circumstances. Statements had lately gone forth that punched holes in iron plates were very injurious to their strength in ship-building, and drilled holes were recommended in preference. His experience did not seem to warrant much superiority in the drilled over the punched plates. Undoubtedly the metal was subjected to greater strain in punching than in drilling; but when the operation was performed with care, the difference was not great between the two methods. Within two years past, steel had been used, to some extent, in place of iron, in shipbuilding; and, as this metal is twice as strong as iron, so much lighter vessels can be built with it. In using steel plates, it is the practice to allow one-third less weight compared with iron, which is a great advantage as regards the floatage of a vessel. But the price of steel is so much higher than of iron, that even with the reduction of about one-third in weight, the cost of a steel steamer would be about a fourth greater than one of iron. If good steel, however, could be obtained at greatly reduced prices, it should and would be preferred to any other material for building ships.

According to the results of experience, the only objection to the use of iron was the liability of the bottoms of iron ships to become foul, and the derangement of the compass, by the local attraction of iron in the hull. The former, principally occurring in vessels going long voyages, would be remedied by the discovery of better compositions. The second was to be met, with difficulty, by fixing permanent magnets in suitable positions, so as to neutralize the attraction. By the adaptation of iron to the construction of rigging, in the place of hemp, a saving of three tuns in weight would be effected in a ship of 1,200 tuns; with steel the saving would be about 6½ tuns in weight, and about the same saving of cost as in the case of iron. Greater durability and less liability to injury from moisture was gained by galvanizing, as well as, in some instances, by covering the iron with hemp. In the construction of masts and yards, in a 1,200 tun ship, a saving of 26 tuns in weight would be effected by making the three lower masts and the bowsprit of iron; and the proportion would be thus—iron, 25 tuns; steel, 19 tuns, wood, 32 tuns. If the whole of the masts and yards were constructed of steel, a saving of 17 tuns over

© 1863 SCIENTIFIC AMERICAN, INC.

wood would be effected ; and, if iron were used, the saving would be 5 tuns.

OUR MARITIME DEFENSES.

We paid a visit to the Novelty Iron Works recently, and found a large force of men busily engaged upon the various contracts now under way at that establishment. Some of these engagements are for engines for the Revenue service, the vessels for which are laying at the large dock below. The engines will be of the oscillating class, with cylinders of 40 inches diameter and 40-inch stroke ; fitted with all the recent improvements in modern engineering—including surface condensers, instruments of all kinds for observing the condition of the engine, testing its duty, &c. They are also to have large boiler power, and it is thought that these ships will prove very fast. The Italian frigate, *Re D'Italia*, recently launched from Mr. W. H. Webb's yard, presents an imposing appearance, moored at the wharf alongside the large derrick. She is "top lofty," in sea phrase ; and has all her masts and much of the rigging already set up. The iron mail upon her sides is now in place, and nearly fastened ; though some portions of it (the upper streaks) will only be put on the ship when she arrives in France. The prow is ornamented with a full length figure of Victor Emanuel, who has a sufficiently imposing moustache, and wears a most determined aspect, as though he intended to defy Neptune, and ride over him, as he does over his countrymen—to be not only King of Italy, but King of the Sea.

The engines and machinery of the *Re D'Italia* are first-class, and consist of two 80-inch cylinders, the pistons of which have four feet stroke. They are to have large slide valves, worked by a very simple and elegant arrangement of arms aud levers ; in addition to which there are "tail valves" to each cylinder ; these are merely small slides that enable the engineers to move the large machines with the greatest ease when the eccentrics are thrown out of gear. Two engines of this class are being made at the Morgan Iron Works for a sister ship, also building by Mr. Webb.

The *Dictator*—the large ocean monitor at the Delamater Iron Works—is rapidly approaching a finished state. We are informed that she will be launched some time during the autumn. A strong force of men is at work, although they are not visible in masses, the vessel being so large that they are lost in her. The ship carpenters are busily engaged in putting on the timber backing of the side armor ; it consists of oak logs, about 12 inches square, laid in sections ; in all about five feet, as we are informed : outside of this there will be ten and a half inches of iron, also put on in sections. The engines and turret machinery are well along, and progressing favorably.

The character of the engines is the same as those on all the monitors, with the exception that the cylinders and all reciprocating parts are vertical ; a desirable feature in engines of this size—namely cylinders 100 inches in diameter by 4 feet stroke of piston.

In the state they now are no adequate description can be given of the general arrangement, except to say that the cylinders are set amidship, and the air-pumps aft of them ; that the steam chests are on the outboard side of the cylinders, where the bonnets can be readily removed, and that expansion valves are provided.

We were told by the workmen that one of the cylinders fell down a distance of five feet, while suspended from the shears, which ruined it so that it had to be replaced by one cast for the *Puritan*, consort, now building, at Greenpoint, by Thomas F. Rowland. The cause of the disaster was the breaking of the guy ropes which stayed the shears ; fortunately, no lives were lost. The company incur a heavy expense by this unavoidable accident, which we regret very much ; the completion of the ship will not be delayed by the casualty. The overhang of the armor shelves on the sides of the *Dictator*, is much less than in the monitors, being only some two feet ; while the projection forward and aft is also less than the same parts in the smaller batteries ; we notice that the armor shelves are strengthened by the addition of iron-plate sponsons.

The *Dictator* has an immense screw propeller, of 21 feet 6 inches diameter, and 32 feet pitch ; there is no outboard bearing for the shaft. The boilers are six in number, three on each side, and are of the return tubular pattern. The ship herself is 320 feet in length, 50 feet in width, and 20 feet deep ; there will be two turrets, whose walls are 15 inches thick ; outside diameter to us unknown.

The *Dunderberg*—a wooden vessel, immensely thick and strong in the hull—is assuming shape and form as rapidly as human hands can do the work. Mr. W. H. Webb is her builder, and the singular appearance of the hull, as well as the monstrous projecting ram forward, attracts much attention, and provokes criticism from every one, whether competent to pass judgment or not. The whole ship is solid throughout, frames, floor and bulwarks ; and with solid casemates, solid plating, guns, engines, commander and crew, she will doubtless prove a valuable addition to our national defenses.

There are numbers of other iron-clads in various parts of the city and suburbs, which we have not had time to visit, but which we hope to inspect at an early day.

THE DIGNITY OF LABOR.

Very much has been said, at different periods of the world's history, about the dignity of labor ; and orators and politicians have turned many pretty periods, and rounded sentences with sonorous allusions to the "bone and sinew of the land." The admiration and adulation of these gentry is partly true and partly false, and too often their sentiments are uttered for sinister purposes. In either event, whether the after-dinner speakers mean what they say or not, no lover of his race can withhold his hearty admiration for the sturdy, law-abiding, hard-working mechanic, who toils with the sun, and wrests from his trade a modest but certain support. The little picture of his home, beautified by the taste of his equally frugal wife ; the children who share his hearth and cot : these have been held up to public view, and have been admired and dwelt upon with pleasure, as they should be. This is one aspect of the mechanic's social position ; and another is that one in which, by the universal consent and vote of his fellow-citizens, the artisan aspires and is elected to an honorable office, in which neither political wire-pulling nor trickery are of any value. The dignity of labor is then realized in the reward of industry and honesty, and the preferment which naturally follows in the wake of integrity when manifested in any sphere of life.

But there is no dignity to be found in those laborers who fritter away their time, and reduce their families to want, by hanging around pot-houses, or in loafing about places where idlers resort. There is no moral worth or value in those individuals who lounge about workshops, and condole with their fellows upon the small amount of wages they receive : who endeavor to incite strikes, thereby bringing beggary and ruin upon themselves ; who deprecate and ridicule the efforts of apprentices to improve their spare hours with study ; and who, in brief, embarrass every good and noble movement by sneering and declaiming against it, or by manifesting spite and opposition to moral and physical advancement of every kind. There is no dignity in the laborers who represent this class let them belong to whatever handicraft they may. They stand metaphorically in the position of Samson of old ; with either arm around the columns of the social temple, they topple the whole fabric to its fall, careless that they also are involved in its destruction. If there were any good workmen among those misguided individuals who lately defied the law in this city, they must have been there through terrorism and compulsion, and not from choice ; for the respectable artisan flies from such scenes of chaos, as from an epidemic, and knows only too well the stigma which attaches to a mobocrat.

TREMENDOUS FORCE OF RIFLED PROJECTILES.—During the furious assault upon Fort Sumter, the first shot fired from the 200-pound Parrott rifle penetrated nine feet into the wall facing Sullivan's Island, after first passing through the gorge wall of the fort ; it knocked over a pile of brick upon a steamer outside of the wall, demolished its smoke stack, and caused the boiler to burst, by which casualty four negroes were killed.

UNINFLAMMABLE FABRICS.

A report has been presented to the French Academy of Sciences by M. M. Payen, Valpeau & Rayer, on treating muslin fabrics to render them uninflammable. Therein it is stated that only three salts have hitherto been found which may be successfully employed in preparing ladies' muslin dresses, &c., to prevent them from taking fire. These are the phosphate and sulphate of ammonia, and the tungstate of soda. To apply them, the phosphate of ammonia is mixed with half its weight of the hydro-chlorate of ammonia, and 20 per cent. of this mixture is dissolved in water, in which the muslin is to be immersed. A solution of 7 per cent. of the sulphate of ammonia produces a similar result, and it is the most economical salt that can be employed for the purpose. But the best solution for dresses, &c., which require to be finished with a hot flat-iron, is that of the tungstate of soda : about 20 per cent. of which should be used in the solution. To obtain the best effects, these solutions should be applied to the dresses after they are starched and dried. Acid tungstates, borax and alum, although they render muslins uninflammable, tend to injure the strength of the material. The sulphate and phosphate of ammonia should be employed on cotton and linen fabrics that do not require to be ironed ; the tungstate of soda for those that are to be ironed. The latter is therefore the safest substance for use in families.

STEAM ON CITY RAILROADS

The whole of this city is being girdled and intersected throughout by lines of railway, that, when complete, will afford the utmost convenience for reaching every street and avenue in its confines. The Third Avenue Railroad is worked exclusively by horses, as are all the other lines. The first-named corporation employs nearly 1200 horses ; and, as a matter of course, has to feed and care for that number ; attendants have to be provided, hostlers, drivers, horse-shoers and others. Large buildings are required, covering an immense space, on which the rate of insurance is necessarily high, from the inflammable nature of the contents : in short the maintenance and support of such a vast number of horses requires an immense outlay of capital, and entails enormous expense to keep the concern at work. These details will all be repeated in the "Gridiron" railroad, and the number of animals required for the several routes must be very great. In view of these facts, does it not seem a little strange that, while the ingenuity of man is capable of furnishing an efficient and economical substitute for the use of horses on city railroads, the managers of these should refuse to avail themselves of such an improvement, and humbly jog along in the same way that other old fogies have for years.

In the small space afforded by the platform of the ordinary city car, steam engines might be placed which would do the work of three teams, without a tenth part of the fuss, dirt, labor, and loss of time involved by the use of animal power. The engine wants no stable, comfortably arranged and fitted, to preserve its health, and the oats it demands are not greater in quantity, considering the amount of work it performs, than the rations of the horse ; it is not exposed to the weather, and seldom gets sick, unless badly made and managed, and there is no more danger from its use than there is in the boilers full of water placed beside the kitchen ranges in houses all through the city. The same care and oversight required in one case will answer for the other.

The prejudices of property holders regarding the use of steam, should not be suffered to stand in the way of a great public convenience, for such it would certainly be. The cars could be run much more quickly, with greater certainty of making time without abusing the horse, they would take less room on the track (a consideration of no small importance), and the whole working expenses of the road would be reduced materially : this is we fancy the most interesting part of the matter to stockholders. Why should we not have steam on our city railroads? Now, if ever, is the time to introduce it, when the whole city is to be turned into a line of railway.

A PHILADELPHIA paper notices that one effect of the draft in that city has been to drive away all the organ-grinders.

© 1863 SCIENTIFIC AMERICAN, INC.

IRON AND STEEL EXTRACTED FROM WASTE IRON CINDERS.

We have received a circular from A. L. Fleury, chemist, Franklin Institute, Philadelphia, in which he states that he has succeeded in extracting good wrought-iron and steel from the waste cinders of puddling and reheating furnaces, which have hitherto been considered a nuisance in their vicinity. He states that, from chemical analysis, he is assured that such cinders contain from 25 to 50 per cent of iron, combined with sulphur, silica, phosphorus, and alumina, forming a brittle compound. Near the large Iron Works at Troy, N. Y., thousands of tuns of these cinders are spread over the roads, and in every 100 lbs. there are about 35 lbs. of iron. By reworking this cinder with lime and charcoal, iron had been extracted, but it was invariably red-short (brittle at a red heat), as the sulphur, silicon, and phosphorum remained combined with the iron. Numberless unsuccessful efforts had been made to work this cinder economically. Mr. Fleury states that the problem of extracting the iron from the cinder and removing the impurities, was solved, by taking advantage of the chemical fact that unslacked burnt lime possesses the property of decomposing silicates during the act of being slacked with water. He mixed a proper quantity of powdered burnt lime, with fine ground iron cinder, wetted the whole with water, and exposed the mixture to the atmosphere. When this compound was dry, it was placed in a common puddling furnace, treated like pig iron, and 50 per cent. of wrought iron was obtained. This product, however, was somewhat red-short, as it contained traces of sulphur: but the impurity—Mr. Fleury informs us—he afterwards extracted, by mixing a chlorine salt with the water which he employed to wet the lime mixed with the cinder; and a good quality of iron, we are informed, can be invariably produced when the operations are properly conducted. It is also stated that the cost of preparing the cinder does not exceed $2 per tun, and the operation of smelting can be executed in puddling, blast, or other suitable furnaces. The invention has been patented in America and Europe.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Lock for Vehicles.—This invention consists in the employment of one or more hooks, constructed, arranged and applied to a wheel vehicle in such a manner that the driver may, from his seat, by a simple manipulation, cause the hook or hooks to engage with the back wheels of the vehicle so as to stop the rotation of the former, and also readily detach the hooks from the wheels when necessary. The invention is an improvement on the chain and hook originally used for locking the wheels of vehicles in descending eminences, and which were far more efficient than the modern brakes for checking the descent of a vehicle, but were abandoned on account of the trouble of getting in and out of a vehicle to lock and unlock the wheels. The object of this invention is to obviate this difficulty and render the adjustment of the hooks, to lock and unlock the wheels, equally as easy as the adjustment of the hand brakes now in quite general use. J. H. Lee, of Leavenworth, Kansas, is the inventor of this device.

Furnace Grate.—This invention consists in imparting to every alternate grate bar a reciprocating rectilinear in contradistinction to a rising and falling or oscillating motion, in such a manner that the coals are raked over and over by the toothed edges of the movable bars moving past the toothed edges of the stationary bars, and the entire fire is cleaned most effectually of all dust, ashes and small clinkers, and the clinkers are not liable to get under or between the bars, and prevent them from going back, which is the case when the bars have a rising and falling motion; and, furthermore, the coals are evenly distributed throughout the entire furnace. T. T. Holdsworth, of Brooklyn, N. Y., is the inventor of this improvement.

Machine for Dyeing, Bleaching and Washing.—The object of this invention is to furnish to hatters and dyers a machine for beating in their dyes, saving time and labor, and to bleachers a machine to clear and wash the goods of chemicals and acids, and replace the old dash wheel and rollers, and also to effect the washing of clothes in families in a novel and easy manner, by beating and rubbing them with a hammer constructed of short india-rubber tubes, or of bristles or any other suitable material, through which the water is conducted while the same acts on the goods or clothes. James Young, of New York city, is the inventor of this improvement.

Lightning-rod Inductor.—This invention consists in a certain mode of combining the holder with the insulator, by which it is enabled to be set at any angle necessary to adapt itself to the direction of the conductor, so that the same insulator may be made to serve equally well for walls or roofs. It also consists in a certain construction of the support, by which it is better adapted to roofs or slanting surfaces. Edwin Eagles, of Mamaroneck, N. Y., is the inventor of this improvement.

Mode of Soldering Cans.—The object of this invention is to effect the soldering of the joints of tin cans and other vessels of sheet metal, by dipping the joint into the melted solder, by which means the soldering can be effected more expeditiously, with a smaller quantity of solder; and the use of a cheaper solder, containing a larger proportion of lead, which would not follow a soldering iron, is permitted; and to this end it consists in the employment, for containing the melted solder, in which the joint is to be dipped, of a pan open in the center, and of such form as to contain the solder, in a channel of a form corresponding with that of the joint to be soldered, without allowing any other portions of the can or vessel but those in immediate proximity to the joint, to come into contact with the melted solder. It also consists in constructing such pan with a resting place for the can or vessel to be soldered to insure the dipping of all parts of the joint in the solder to a uniform depth. Herman Miller, of New York city, is the inventor of this improvement.

Going Back to Wood Again.

The price of coal has gone up so high that the New York railroads have commenced using wood, again, for the running of their locomotives, they finding it cheaper. Of course, this can only be a temporary return to this kind of fuel; coal must, from the nature of things, be permanently cheaper than wood. When locomotives first began to run, wood was the only fuel used upon them; but the enormous consumption of the engines soon relieved the face of the country of its forests, and every year wood grew dearer, till it became a question of economy to use coal. Coal has been so long used that the forests of New England and others of the older settled States, which were being rapidly denuded, having had a few years of comparative rest, are now becoming wooded again; and as temporary causes have raised the price of coal, it may be cheaper in States distant from the coal beds, to use wood. The New York Central is running its heavy freight trains with wood at the cost of twelve cents per mile. By experiment on the Baltimore and Ohio Railroad, it was found that one pound of Cumberland coal was equal to 2-55 pounds of pine wood. On the Reading Railroad it was shown that one pound of anthracite was equal to three pounds of pine wood. With this advantage, coal can be considerably higher than wood and be the cheaper fuel.—*Philadelphia Ledger.*

An Extraordinary Piece of Charcoal.

Dr. Rowell, of this city, has shown us a piece of charcoal which he uses to lay gold on to be annealed under the blow-pipe, and which he says he has had for thirty years, and that it has been on fire at least as often as once a day during the whole of that period. It is burned into the form of a shallow trough, but the cavity is not more than an inch in depth; showing that not more than one-thousandth part of an inch has been burned away at each ignition. It is probable that the gases so completely envelope the heated surface that, though this is red hot, no actual burning generally takes place. Dr. Rowell says that he finds great difference in different pieces of charcoal—some burning out very quickly, and he never had any other piece last nearly as long as this. This piece is of pine.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING AUGUST 18, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis oy addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,539.—Process for Finishing Flannels.—Samuel Archer, Globe Village, Mass. :

I claim the process, substantially as above described.

39,540.—Rotary Pump.—Joseph Banks, New York City :

I claim, first, arranging the valves, G G', in slots or recesses, in the edges of the pistons, F, as and for the purpose shown and described.

Second, The springs, b b', under the valves, G G', when the same are used in combination with pistons, F, connected by stems, a, in the manner and for the purpose substantially as specified.

[The object of this present improvement is to produce a tight joint between the edges and ends of the sliding pistons and the inner surface and heads of the cylinder of a rotary pump, by simple and easily-adjustable means.]

39,541.—Apparatus for Carburetting Gas.—J. A. Bassett, Salem, Mass. Ante-dated March 18, 1863 :

I claim the uniform carburation of gas under varying conditions of temperature, by the direct application of the hydro-carbon liquid to the burner, by the means shown, and the use, in combination, of the flanges, C1 C2, with the deflecting plate, D, or their equivalents, when used for this purpose, the whole arrangement operating together substantially as represented and for the object set forth.

39,542.—Firing Fuses by Electricity.—F. E. Beardslee, College Point, N. Y. :

I claim connecting the two conducting wires by a feeble conductor, substantially such as herein described, and placed in contact with, or in close proximity to the powder, substantially as set forth.

39,543.—Firing Cannon by Electricity.—G. W. Beardslee, College Point, N. Y.:

I claim combining with the barrel of the cannon, or other fire-arm, an insulated plug extending through the metal from the bore to the outside, substantially as specified, to be used with a cartridge having a fuse provided with two conducting wires, so that, when inserted in the bore, one will be in contact with the bore and the other with the insulated plug, as described.

39,544.—Gaiter Boot.—J. C. Breed and C. K. Bradford, Lynn, Mass. :

We claim, first, A gaiter boot, the two parts, A and B, being so constructed as to overlap each other from the sole to the top, with a row of eyelets in the one part directly over and parallel with a similar row in the other part, substantially as set forth and described.

Second, The sliding stop or fastener, f, in combination with the lacing arrangement, substantially as and for the purpose described.

39,545.—Railway Carriage.—N. F. Bryant, East Boston, Mass. :

I claim the automatic combination consisting not only of the chock rails, or their mechanical equivalents, applied to the roadway, and the chocks, or their mechanical equivalents, applied to the truck frame and its wheels, but the two tracks of different gages and their wheel-changing track, or the same and its flanch guide rails, the whole being arranged and so as to operate substantially as specified, and in combination therewith, I claim the projections or guides, n n, for the purpose specified.

39,546.—Polishing Machine.—Benj. Q. Budding, Milford, Mass. :

I claim the polishers, F, when arranged so as to be capable of simultaneous pressure against, and reciprocating rotary movement around, the edge or side of the heel, as set forth.

I also claim the combination of arms, G, springs, f, collar, I, and link, g, or their equivalents, for producing the motion of the polishers, against and away from the heel, as above described.

I also claim the arrangement of mechanism consisting of the plate, e, adjustable crank-pin, g3, joint, l, and crank wheel, k, or the mechanical equivalent thereof, operating together substantially as described.

I also claim combining a pressure mechanism, as shown by the arm, G, collar, I, link, g, shaft, J, rods, I' L, and treadle, K, or other suitable mechanism for producing the pressure of the polishers, with a shipping mechanism, consisting of lever, q, rod, p, or their equivalent, for their simultaneous operation, substantially as above set forth.

I also claim, in combination with the bearing plate, d, the springs, c c, operating in the manner and for the purpose as described above.

39,547.—Pack Saddle.—W. T. Campbell, Philadelphia, Pa. :

I claim, first, The two bars, A and A', connected together and maintained a given distance apart from each other by the wrought-iron arched pieces, B and B', as set forth.

Second, The piece, D, with its projections, d and d', the whole being applied to the two bars, substantially as described.

Third, The detachable pins, E, arranged on the two bars, substantially as set forth.

Fourth, The rings or eyes, M and N, arranged on the two bars for the reception of the binding rope, substantially as described.

39,548.—Hand Corn-planter.—Myron Case, Kasoag, N.Y.:

I claim the combination of the slide, i, provided with the inclined seed aperture, j, passing entirely through it, the recess, n, the back piece, c, below the seed reservoirs, the plates, f B, partition, h, and gum-elastic cut-off, k, placed within and attached to the seed box, A, the whole being constructed and arranged as and for the purposes specified.

39,549.—Cooking Stove.—A. E. Chamberlain and Wm. Caven, Cincinnati, Ohio :

We claim, first, The deflector, K, in the described combination with the extended box top, G, boiler opening, J, and ventagenozzle, L, substantially as set forth.

Second, The construction of an extended box top with the incurved partitions, M M, between the heat chamber, G, and the boiling flue, B, for the provision of an extended stove top within the shortest practicable limits, as explained.

Third, We claim as a new and improved manufacture of extended top cooking stoves, the extended box top or chamber, G, having the incurved partitions, M M', deflector, K, supplementary boiler opening, J, and aventage nozzle, L, in the rear thereof, the whole being combined and operating together in the manner set forth.

39,550.—Machine for Amalgamating Precious Metals.—Ezra Coleman, San Francisco, Cal. :

I claim the use, in amalgamating pans, of a plate with grinding surfaces, top and bottom, said plate revolving between two other plates.

I also claim the use of a top p ate, D, in amalgamating pans for the purpose of regulating the agitation of the pulp, the whole substantially as described and for the uses and purposes as hereinbefore set forth.

© 1863 SCIENTIFIC AMERICAN, INC.

39,551.—Coal-oil Lamp.—C. E. Corbitt, Corbettsville, N. Y.:

I claim surrounding the tube of the ordinary coal-oil lamp with packing of cotton or other porous substance, as and for the purposes described.

39,552.—Spark-extinguishers of Locomotives.—P. H. Corlett, Manchester, Pa.:

I claim, first, A chambered valve, E, with one or more openings, e e', so arranged in regard to the throat, a, and discharge orifice, a', that when the discharge orifice is open, the receiving opening is closed, and *vice versa*, thus preventing the admission of a current of air into the smoke box while the cinders are being discharged, as specified.

Second, I claim working the valve by a crank motion, rock shaft, pawl and ratchet, or gears, as and for the purpose specified.

39,553.—Cultivator.—Samuel Cowan, Bloomfield, Iowa:

I claim, in combination with the adjustable and hinged cultivator stocks, herein described, the levers, K, rods, N O, and treadles, M, substantially in the manner and for the purposes set forth.

I also claim, in combination with the adjustable and hinged cultivator stocks herein described, the lever, H, and transverse bar, G, for the purpose of shifting said cultivators sidewise, substantially in the manner and for the purposes set forth.

39,554.—Tea-kettle.—W. C. Davis, Cincinnati, Ohio:

I claim the mode of hinging the covers of tea-kettles and other cast hollow-ware, consisting of the oval socket, D E E', pintle, F F', tongue, I, and aperture, H, or their equivalents, the whole being combined and operating as set forth.

39,555.—Cooking-stove Cover or Shield.—H. W. De Puy, Jalapa, Nebraska:

I claim the combined stove cover and shield, as shown in figure 2, when used in connection with any cooking utensil, as and for the purpose set forth.

39,556.—Manufacture of Textile Fabrics.—T. J. Dunkin, New York City:

I claim the employment or use, in the manufacture of textile fabrics, &c., of the silky down contained in the seed cells of milk-weed or Asclepias Syriaca, substantially in the manner herein set forth and described.

[This invention consists in the employment of the silky down contained in the seed vessels of milk-weed, either pure or by mixing the same in certain proportions with cotton, wool, silk or other fibrous materials, for the purpose of producing textile fabrics of any description, such as silk, thread, twine, or wadding and batting.]

39,557.—Spindle of Spinning Machines.—James Eaton, Boston, Mass.:

I claim the small nipple or projection, having its base upon a shoulder, which extends to the periphery of the spindle, by which means the yarn is brought near to the axis of rotation, and at the same time prevented from slipping off the end of the spindles, as herein described.

39,558.—Grinding Mill.—G. Eberins and F. A. Heinig, Washington, Mo.:

We claim the introduction of a continuous current of air between the grinding surfaces of mill-stones, in combination with the open space, g, and receiving chamber, h, all being constructed and arranged substantially as and for the purposes set forth.

39,559.—Harvester.—D. L. Emerson, Rockford, Ill.:

I claim an extensible finger beam constructed of parts combined together, in such manner that one part overlaps another so as to be capable of extension and construction by overlapping the parts less or more, substantially as herein set forth.

I also claim the combination of an extensible finger beam with a back beam adapted to secure the rear of the divider frame in different positions, substantially as herein set forth.

I also claim the combination of the gathering board of the divider at its lower edge with the fixed part of the divider, by means of hinge connections and an adjustable controlling instrument, in such manner that this board can be set at a greater or less inclination to gather in less or more grain, substantially as herein set forth.

I also claim the combination of the divided point, with the remainder of the divider, by fastenings, in such a manner that it can be set in different positions both laterally and vertically, substantially as herein set forth.

39,560.—Hand Cultivator.—R. B. Fitts and J. W. Thackara, Philadelphia, Pa. Ante-dated Jan. 16, 1863:

We claim, first, The stem, A, in combination with the ring, B, constructed and arranged to receive the detachable teeth, C C C, and cutting scrapers, D D D, substantially in the manner described and set forth, for the purposes specified.

Second, We claim the teeth, C C C, in combination with the ring, B, the said teeth being arranged so that they may be detached, substantially as described, for the purpose specified.

Third, We claim the cutting scrapers, D D D, in combination with the ring, B, the said scrapers being arranged substantially as described, for the purpose specified.

Fourth, We claim in combination with the stem, A, and ring, B, the cylindrical cutter, E, the same being made adjustable on the stem, A, substantially as described and set forth, for the purposes specified.

Fifth, We also claim, in combination with the cylindrical cutter, E, the detachable hilling plates, F F F, the said plates being formed and arranged to operate therewith in the manner substantially as described, for the purpose specified.

39,561.—Carriage Wheel.—H. K. Flinchbaugh, Conestoga Center, Pa.:

I claim the wrought-iron spokes, when inserted directly into the ridge, r, on the tire, by means of a screw cut on the outer end, bringing their other ends, alternately to the right and left of a central line around the hub, in which they are firmly imbedded, by having the hub molded and cast around them, substantially in the manner specified.

39,562.—Shaft Bearing.—J. B. Francis, of Lowell, Mass.:

I claim the employment of mercury as a bearing for upright shafts, substantially in the manner as set forth.

39,563.—Wire Fence.—Elbridge Gale, Pavilion, Ill.:

I claim, first, The fastening of the wire firmly to the posts by looping or wrapping the wire around the whole or a portion of the posts, or by drawing the wire through the post and bending on either side, as described.

Second, I claim the use of the link, h, in the manner and for the purpose set forth.

39,564.—Engine Lever.—T. W. Godwin, Portsmouth, Va.:

I claim, first, The use of the lower cross balance bar, e, having the teeth, g g', substantially as and for the purpose described.

Second, The construction and use of the upper cross balance bar, k, in one solid piece, of the form of an inverted cross, substantially as and for the purpose set forth.

39,565.—Apparatus for rendering Oils and Fats.—C. E. Gray, St. Louis, Mo.:

I claim, first, The application of a second steam-tight vessel for receiving melted fat or other fluid material that may have been cooked under steam pressure, and for cooling down and purifying the same until it is in a proper condition for exposure to the atmosphere, substantially as before described.

Second, The placing of a glass tube in the draw off-pipe from the digester, or similar apparatus for the treatment of material under steam pressure for the purpose specified, substantially as before described.

39,566.—Stock for Shearing Sheep.—Richard Gregg, Lawrenceburgh, Ind.:

I claim the adjustable upright, D, in combination with the arm, E, formed of two parts, g h, connected together by a swivel joint, i, and the revolving bar, F, provided with clamps, G, and fitted in the outer end of the arm, E, all being arranged substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a simple and efficient device to aid in shearing sheep, and it consists in the employment of adjustable uprights in connection with adjustable arms, the latter being fitted on the former and provided with swivel stocks or leg clamps.]

39,567.—Sewing-machine Shuttle.—T. J. Halligan, New York City:

I claim, first, A shuttle for waxed-thread sewing machines, constructed with the hinged lever bobbin frame and direct-acting tension screw, substantially as shown in figure 3, for the purposes set forth.

Second, The combination and arrangement of a smooth transverse bar, c, opening, b', formed as described, and bobbin, b, whereby I am enabled to obtain the desired tension on the thread, and while I pass the thread through the top of the shuttle, prevent the scraping off of the wax from the thread, substantially as described.

39,568.—Valve for Pumps.—C. B. & J. Hardick, Brooklyn, N. Y.:

We claim the stops, p, extending from side to side of the valve chest over the seat and receiving the cylindrical or prismatic valves, as specified.

39,569.—Stocking.—Emanuel Harmon, Washington, D. C. Ante-dated March 1, 1863:

I claim as a new article of manufacture sections of stockings made as and for the purposes specified.

39,570.—Stocking.—Emanuel Harmon, Washington, D. C., Ante-dated March 12, 1863:

I claim as an improved article of manufacture, stockings made of any textile material and covered at the heels and toes with flexible leather, or its equivalent, substantially as described.

39,571.—Galvanic Battery.—E. A. Hill, Galesburg, Ill. Ante-dated April 9, 1862:

I claim the peculiar local positions of the elements with reference to each other and the use of two or more saline solutions without a porous position to separate them, substantially as set forth.

39,572.—Crochet Needle.—J. M. Hoadley, Derby, Conn. Ante-dated Jan. 17, 1863:

I claim a crochet needle or instrument, so constructed that the needle may be folded or closed into the handle and distended, or held out firmly, in a working position, at pleasure, substantially as and for the purposes set forth.

39,573.—Grate for Furnaces.—T. T. Holdsworth, Brooklyn, N. Y.:

I claim the arrangement of the shaft, D, cams, a, and lever, E, with the alternate toothed bars, in the manner herein shown and described, so as to produce the motion upon said alternate bars in connection with the teeth, all as set forth.

39,574.—Case for a Ratchet Wheel for Lamps.—Lewis Hover, Chicago, Ill.:

I claim, first, The described manner of securing the cap on the wick tube or burner, by inserting one or both ends of said cap in perforations made in the burner for that purpose.

Second, I claim one or more perforations made in the burner for the insertion of the ends of the cap, and thus constituting a fastening for said cap, as explained.

Third, I claim the cap herein described, when one or both ends are made to act as a spring or wick sustainer, as explained.

39,575.—Ice-creeper.—Isaiah S. & John W. Hyatt, Jr., Chicago, Ill.:

We claim the self-locking creeper, herein described, as a new article of manufacture, the same being in a single piece, with the central screw, A, holding spurs, D, and ice-spurs or surfaces, C, arranged to operate together, substantially as herein described.

39,576.—Preserving Iron-plated and other Vessels.—Jean Pierre Jouvin, Rochefort, France:

I claim, first, The applying, and the mode of applying on the internal part of the holder of iron ships, zinc sheets, either alone or combined with the use of a metallic zinc paint, or of felt sprinkled with metallic zinc powder, to preserve iron-plated and other ships from the destructive action of sea-water, as hereinbefore described.

Second, The production of a poisonous compound and its application to iron ships' bottoms, and to wood employed to secure dikes, embankments, docks, and for naval and other constructions, in order to prevent, for the former, the deposit of barnacles and sea-weeds, and to protect the latter from injury from teredos, as hereinbefore described.

Third, The application to iron articles of a paint having pulverized metallic zinc for base to replace the red-lead paint, as hereinbefore described.

39,577.—Pump.—W. S. Judd, Chanhassen, Minn.:

I claim the tubular reciprocating rotating piston rod, C, provided with the piston, K, in combination with the plates, d, placed within the cylinder, A, and provided with valves, M, all arranged to operate as set forth, and either with or without the pipe, N.

[This invention relates to an improved submerged pump, and consists in the employment of a tubular rotating reciprocating piston rod in connection with a piston, valves, and stationary water passages within the cylinder, all arranged in such a manner as to form a very simple and efficient pump of the class specified, and one which may be used to elevate the water to the top of the well only, or to force water at a considerable distance, as may be required.]

39,578.—Artificial Limb.—H. A. Kimball, Philadelphia, Pa.:

I claim as a new article of manufacture an artificial limb having its members made of vulcanized gum, cast in molds, and in imitation of the exterior form of the natural limb as set forth for the purpose specified.

39,579.—Drain Tile Machine.—Henry Knight, Brooklyn, N. Y.:

I claim, first, Guiding and directing the passages of the farming tool through the pipe, in its operation of spreading the cement thereon, by means of a stationary rod, G, substantially as described.

Second, The employment of base and cap rings, a c, or their equivalents, in conjunction with a conical farming tool, G, substantially as and for the purposes described.

39,580.—Hose Coupling.—Willard Knowles, Boston, Mass.:

I claim the said improved hose coupling as consisting of the two interlocking connections, C D, and the screws, g h, constructed, arranged, and applied together, and to the hose necks or tubes, A B, substantially in manner as specified.

39,581.—Lock for Wheel Vehicles.—J. H. Lee, Leavenworth, Kansas:

I claim, first, The employment or use of one or two bars, G, attached to the body of the vehicle and arranged with joints in such a manner that they may be moved in both a vertical and horizontal plane, and provided with hooks, I, which, by the movements of the bars aforesaid, may be engaged with or detached from the wheels, in order to lock and unlock the same as set forth.

Second, The manner of attaching or arranging the hooks, I, with the bars, G, so as to admit of the former being readily released from the wheels, to-wit: by having the hooks, I, attached to rods, H, which are pivoted in slots in the bars, G, and having springs, i, connected with the hooks and arms, J, or any suitable clicks to engage with the rods, H, substantially as set forth.

Third, The shaft, B, provided with the spring, E, the lever, C, and arm, L, with the rods, K, and arms, J, in combination with the bars, G, spring, M, and rods, H, provided with the hooks, I, all arranged to operate substantially as and for the purpose herein set forth.

39,582.—Coal Stove.—Dennis G. Littlefield, Albany, N. Y.:

I claim in stoves using a supplying cylinder for reserve coal, and an external case surrounding the same, the suspension or arrangement of the fire-pot, or burning chamber, in a chamber, C, at the base of the stove, entirely shut off, or separated from the chamber which receives the heat directly from the burning fuel, and the heated products of combustion, so that said chamber, C, may separately receive the heat radiated from the outer surfaces of the fire-pot, and transmit it to the surrounding case, and from thence radiate it near the floor, to the apartment to be warmed, substantially as herein specified.

In combination with the fire-pot, suspended, or arranged in a separate chamber at the base of the stove, I also claim the suspension of the supplying cylinder in the combustion and heat transmitting chamber, G, above and separate from the fire-pot, substantially as and for the purpose herein set forth.

I also claim suspending the detachable soapstone or fire-brick supporting cylinder, L, of the separately suspended supplying cylinder, by means of the eyes, o o, and stirrups or hasps, p p, or their equivalents, in order that the said section may be detached from below, without the necessity of raising it through the supplying cylinder itself; substantially as herein specified.

I also claim the construction and arrangement of the stove, in such a manner that it not only may be a connected individual whole, but may be readily separated into two sections (Figs. 3 and 4), each complete in itself, to the extent described when thus applied in relation to the suspended fire-pot in a separate chamber at the base of the stove, and to the separately suspended supplying cylinder, substantially as and for the purposes set forth.

39,583.—Variable Exhaust for Locomotives.—Richard McDowell, Lambertsville, N. J.:

I claim the combination of the spring, g, with the wings, b b, and exhaust, D, in the manner herein shown and described.

[By this ingenious device the exhaust regulates itself according to the pressure of the steam.]

39,584.—Pantaloons.—Harmon Osler, Philadelphia, Pa.:

I claim a garment having legs, each leg formed by the sutures, C I D H E J, substantially as shown and described.

39,585.—Faucet.—William Pinkerman, Bridgeport, Conn. Ante-dated Nov. 12, 1862:

I claim the double screw faucet, A and B, the inner one traveling in and out by the action of the coupling, D, in the manner described and for the purpose substantially as set forth.

39,586.—Lantern.—William Porter, New York City:

I claim the socket, N, provided with a ring, e, of leather, cork, or other suitable material, in connection with the smooth cylindrical part, f, of the cap, substantially as and for the purpose herein set forth.

[This invention relates to an improvement in lanterns which are provided with lamps having flat wick-tubes, and a serrated or notched wheel for raising and lowering the wick. The object of the invention is to obtain a means for admitting of the end of the serrated wheel shaft projecting through the side of the lantern, to enable the wick to be adjusted without detaching the lamp from the lantern, and at the same time admit of the lamp being readily adjusted in the lantern and detached therefrom, and also admit of the cap of the lamp being fitted with facility in the latter, so that the wheel-shaft may always be adjusted in a proper position relatively with the notch in the base of the lantern.]

39,587.—Soda Water Cooler.—A. D. Puffer, Somerville, Mass.:

I claim so constructing the inlet and outlet pipes of a series or system of cooling cylinders, and the pipes connecting said cylinders, that the orifices in said pipes shall be adjacent to the nearest ends of said cylinders, substantially as and for the purpose set forth.

39,588.—Hay and Cotton Press.—Charles H. Robinson, Bath, Maine:

I claim the levers, B B, and bars, C, connected together as shown, in combination with the follower, G, rods, E F, and windlass, H, all being arranged and applied to the framing, A, to operate as and for the purpose herein set forth.

[The object of this invention is to obtain a simple, efficient, and portable or compact press, for compressing hay, cotton, and other substances for baling by means of animal or other power. The invention consists in a novel arrangement of levers, connecting rods and fulcrum rods, combined with a follower in such a manner that the desired end is attained.]

39,589.—Applying Wash to Sand Molds.—David Robinson, Cold Spring, N. Y.:

I claim the cylinder, A, provided with an internal tube, B, and shell, D, of conical or other form, all arranged and combined substantially as and for the purpose set forth.

[This invention consists in the employment or use of a cylinder provided with an internal tube, one end of which is provided with a hopper or funnel, and the other end fitted in a shell of conical or other form, which is attached to the cylinder in such a manner as to have openings or spaces between the shell and cylinder, all being so arranged that the device may be fitted within the mold, and by pouring the wash into the former the latter will be coated with the wash not only in a superior manner, but far more expediently. The invention is more especially designed for applying wash to molds for casting projectiles for ordnance.]

39,590.—Machine for making Nuts and Washers.—Ives Scoville, Chicago, Ill.:

I claim, first, In a machine for making perforated nuts or washers, combining a stationary bed, G, with one or more cams, G'', on its working face, a rotating die carrying disk and a horizontally oscillating and vertically sliding ring, G', substantially as and for the purpose set forth.

Second, In a machine for making perforated nuts or washers, providing the groove, i, in and around the underside of the die carrying disk, H, substantially as and for the purpose set forth.

Third, Punching nuts or washers upon the top of perforated sliding die boxes, g', and within enclosing and supporting walls of the dies of the rotating disk, substantially as and for the purpose set forth.

Fourth, Both swaging and punching nuts or washers at one operation upon the top of perforated sliding die boxes, g', of a rotating disk, H, while the metal out of which the nut is formed is enclosed by the walls of the die, substantially as and for the purpose set forth.

Fifth, In a machine which makes perforated nuts or washers, effecting the discharge of the finished nuts or washers at the top of the horizontally rotating die carrying disk, H, by means of sliding perforated die blocks, g', which are carried around with the rotating disk, H, substantially as set forth.

Sixth, In a machine which makes perforated nuts or washers, constructing the bed, G, with a hub in combination with the fitting of the bed and the die carrying disk together, by means of a screw or screws and a spring, substantially as and for the purpose set forth.

Seventh, Fitting the ring, G', to the bed, G, and upon springs, substantially as and for the purpose set forth.

Eighth, Constructing the die carrying disk of a machine which makes perforated nuts or washers with inclines, e', and notches, t, in combination with the constructing of the ring, G', with inclines, e', substantially as and for the purpose set forth.

Ninth, The combination in a machine which makes perforated nuts or washers, of a rock shaft, N, retaining catch, R, inclines, e e', and notches, t, substantially as and for the purpose set forth.

Tenth, The combination in a machine which makes perforated nuts or washers of the rock shaft, N, retaining catch, R, notches, t, inclines, e e', cams, G2, and movable perforated die boxes, g', substantially as and for the purpose set forth.

Eleventh, The combination in a machine which makes perforated nuts or washers, of the flat or plain end cutting tool, K, and a table, L, which has a stationary enclosed guiding and cutting die formed in it, substantially as and for the purpose set forth.

Twelfth, In a machine which makes perforated nuts or washers, the table, L, with its die, k, constructed in it, arranged over the die-carrying disk, H, and in the relation described to the pockets, g, and so that it forms an independent or auxiliary die and an enclosing guide for truly delivering the blanks into the pockets, substantially as set forth.

Thirteenth, A stationary die table, L, with ledges, l l', and guide die, k, for use in connection with machines which make perforated nuts or washers, substantially as set forth.

Fourteenth, Producing the blanks from a strip of metal within an enclosed auxiliary die and immediately delivering them therefrom into the pockets, g, substantially as and for the purpose set forth.

39,591.—Magazine Fire-arms.—Joseph N. Smith, Cincinnati, Ohio. Ante-dated Jan. 21, 1863:

I claim, first, Constructing the stock of the gun in two parts, with a broad groove, A', so that the cartridges may be placed in said groove horizontally transverse to the stock, substantially as herein set forth.

Second, The wheel, 17, and ratchet, 16, used as described, with the cord, 15, and follower, 14, and spring, 18, for moving and stationing the cartridges, substantially as specified.

Third, The turn table, E, with openings for admitting the cartridges laterally, operating substantially as specified, for the purpose of turning the cartridges in the right direction, substantially as set forth.

Fourth, The use of the opening through the breech-piece, at R, corresponding with the opening in cylinder, C, for the purpose herein set forth.

Fifth, The employment of the rack bar, C', in combination with the spring catch or brace, D, constructed, and operating substantially as set forth.

Sixth, The employment of the cam wheel, L, and plate, M, or their equivalents, constructed and operating substantially as set forth.

Seventh, The use of the bar, N, or its equivalent, for operating cylinder, C, and table, E, as herein set forth.

Eighth, The employment of the segment, H, as constructed, when used in connection with the cock and the segment pinion on the shaft, D, arranged substantially as set forth.

© 1863 SCIENTIFIC AMERICAN, INC.

Ninth, The employment of the wiper, 8, or its equivalent, and the plate, 7, for the purpose specified.

39,592.—Fire-arm.—Daniel E. Somes, Washington, D. C.:

I claim, first, The construction of a gun so that by means of springs or their equivalents, the ball or projectile shall be held at any given point of the barrel until any required force of the charge is exerted upon it.

Second, The sliding bolts, e e e, the springs, f f f, and the gage screws, g g g, substantially as and for the purpose described.

39,593.—Elongated Projectile for Fire-arms.—Joseph Nottingham Smith, New York City:

I claim, first, The combination of the point bolt, E, and cylinder, D, with their powder chambers, m and i, arranged so as to ignite the powder therein successively, from the concussion of the projectile in striking, substantially as and for the purpose herein specified.

Second, I also claim the arrangement of the magazine, chamber, h, in the shaft of the projectile, in combination with the powder chambers, i and m, so as to fire the powder in succession, after the firing of the charges in the other chambers, substantially as and for the purposes herein set forth.

39,594.—Stiffening for heels of Boots and Shoes.—E. M. Stevens, Boston, Mass., assignor to Alfred B. Ely, Newton, Mass.:

I claim as a new article of manufacture, for the heels of boots and shoes, a stiffening made of india-rubber, mixed with ground rags, or other suitable fibrous material, substantially as set forth and for the purpose described.

39,595.—Ambulance.—Augustus Wm. Süs, New York City. Ante-dated July 7, 1863:

I claim, first, The movable seats, E E′, constructed and secured substantially as set forth.

Second, The hinged cots or stretchers, K K′, in the described combination with the movable seats, E E′.

Third, The folding head and foot rests, M N, applied to the hinged cots, K K, substantially as shown and described.

Fourth, The described arrangement of the water tank, U, and drawer, V, beneath the body, A, of the ambulance.

39,596.—Breech-loading Ordnance.—Elisha A. Sutcliffe, New York City:

I claim connecting the movable breech-piece, C, with the hollow tightening and sustaining screw, B, by means of a pin, c, or its equivalent by which the turning of the said screw in and out is made to raise and lower the breech-piece and so close the breech of the gun substantially as herein described.

[This invention relates to the employment of a movable breech-piece inserted into a mortise provided in the gun, and a tightening and sustaining screw which screws directly into the breech, and is bored out large enough for the passage through it of the projectile and cartridge. It consists in so combining the said breech-piece with the hollow screw that it is opened by the act of turning back the screw.]

39,597.—Cultivator.—James P. Tostevin, Racine, Wis.:

I claim the combination and arrangement of braces, H, hooks, I, nuts, J, and staples, L, operating substantially in the manner and for the purposes set forth.

39,598.—Smut Mill.—B. T. Trimmer, Rochester, N. Y.:

I claim the double faced bearings or lugs, H H, provided with the slots, k k, or their equivalent, in combination with the beaters, I I, for attaching, adjusting, and shifting said beaters, and adapting the machine to be run in either direction, substantially as herein described.

In combination with the beaters thus attached and adjusted, and provided with teeth, m m, I also claim the intermatching teeth, n n, arranged and operating substantially as and for the purposes herein specified.

39,599.—Artificial Leg.—Thomas Uron, San Francisco, Cal.:

I claim, first, In combination with the toe and metatarsal joints the cord, e, and springs, S and S′, for raising and lowering the toes and metatarsal joint, substantially as herein described.

Second, I also claim the cords, a, and strap or cord, a′, in combination with the pulleys, p and p′, substantially in the manner and for the purpose set forth.

Third. I also claim in combination with pivoted foot, C, the strap, r, passing over pulley, p, for the purpose of giving steadiness to the ankle joint, substantially as herein described.

Fourth, I also claim the knee pan, K, in combination with cords, n, and pulleys, o, for the purpose of retaining the leg in any desired position while in a sitting posture, substantially in the manner herein described.

Fifth, I also claim in combination with the tendon Achilles strap, X, the strap, i, and spring, S‴, substantially in the manner and for the purpose herein set forth.

39,600.—Churn Dasher.—Henry P. Westcott, Seneca Falls, N. Y.:

I claim, first, The dasher, h, constructed and made adjustable as and for the purpose set forth.

Second, The adjustable dasher, h, in combination with the dasher, or its equivalent.

39,601.—Ship of War.—John Wheatley, the Royal Navy, England. Patented in England, Dec. 2, 1862:

I claim the arrangement of the sharp bow and glacis, forward of the center of the ship, so as to admit of the placing and "laying" of the guns, by the steerage of the ship, as set forth and shown.

39,602.—Camera Stand.—John A. Whipple, Boston, Mass.:

I claim elevating and arresting the camera by the mechanism arranged and operating substantially as herein described.

39,603.—Cooking Apparatus.—E. Whiteley, Cambridge, Mass.:

I claim casting the kettle, A, in one piece with its steam chamber, B, and solid portions, e, in the manner and for the purpose substantially as described.

39,604.—Construction of Ordnance.—Norman Wiard, New York City:

I claim, first, The within described arrangement in guns of the oblique holes, B, for the purpose of promoting both the longitudinal and radial expansion of the inner metal as herein set forth.

Second, I claim in connection with such holes, B, or with equivalent holes or parts thereof extending parallel or nearly parallel to the axis, the employment of the oblique or curved connections, A3, between the outer and inner metal of a gun for the purpose herein set forth.

Third, I claim the within described arrangement and combination of a highly compressive reinforce, A2, the elastic webs, A3, and the interior metal, A1, of a gun, substantially as and for the purpose herein set forth.

39,605.—Manufacture of Illuminating Gas.—S. Lloyd Wiegand, Philadelphia, Pa.:

I claim, first, The hereinbefore described form of retorts whether cylindric or prismatic as hereinbefore described, when arranged in the oven in the manner and for the purpose set forth and used as hereinbefore specified.

Second, The arrangement of flues and dampers when combined as set forth with the retorts of the form specified.

Third, The construction of the top of the oven when used in combination with the retorts as hereinbefore specified.

39,606.—Manufacture of Illuminating Gas.—S. Lloyd Wiegand, Philadelphia, Pa.:

I claim the combination of the processes of separating the volatile parts of hydro-carbons, by the aid of superheated steam at a lower temperature than will convert the hydro-carbons into gas and the subsequent decomposition of said volatilized hydro-carbons simultaneously with superheated steam in the presence of incandescent carbon, at temperatures which convert both the steam and hydro-carbon vapors into permanent illuminating gas, when conducted in the manner substantially as set forth or in any other equivalent manner.

39,607.—Distilling Oils and Paraffine from Peat and other Substances.—S. Lloyd Wiegand, Philadelphia, Pa.:

I claim the use of the products of the decomposition of steam by means of incandescent carbon in the separation of hydro-carbon oils and paraffine from peat or coal or other bituminous substances whether used by themselves or in combination with super-heated steam.

39,608.—Device for Centering Shafting.—F. B. Williams, Sterling, Ill.:

I claim the combination of the driving and centering device, A, support, B, and the drill and cutters or blades, g f f, constructed and applied to a lathe for the purpose of centering shafts as herein set forth.

[This invention consists in the employment or use of a pronged centering device, a rest or support, and a drill and cutter, applied to an ordinary lathe in such a manner as to admit of shafting being readily centered, and the ends turned or cut perfectly square or at right angles to their peripheries.]

39,609.—Machine for dyeing, bleaching, &c.—James Young, New York City. Ante-dated March 13, 1863:

I claim, first, The employment of the reciprocating rising and falling hammer, G, in combination with the endless apron, D, constructed and operating substantially as and for the purpose described.

Second, Passing the liquid or liquids through the hammer into the goods or cloth es substantially as and for the purpose set forth.

Third, The arrangement of two or more stirrups, l, in combination with the longitudinally sliding guide roller, j, and with the hammer, G, constructed and operating substantially as and for the purpose specified.

Fourth, The combination with the reciprocating rising and falling hammer, G, of a tank, C, divided into a series of compartments, e f g, and provided with faucets, e′ f′ g′, all arranged and operating substantially in the manner and for the purpose described.

Fifth, The arrangement of the automatic cut-off, L, in combination with the hammer, G, constructed and operating substantially in the manner and for the purpose specified.

Sixth, the employment of corrugated glass rollers, q, in combination with the hammer, G, and apron, D, as and for the purpose set forth.

Seventh, The arrangement and combination of the table, A, tank, C, hammer, G, endless apron, D, and wringer, E, all constructed and operating substantially as and for the purpose described.

39,610.—Refrigerator.—W. M. Baker, Assignor to himself and W. R. Heath, of Walpole, Ind.:

I claim, first, The provision shelves formed of the rods, e, in combination with the inclined plates, f, and filter, or water receptacle, F, and the grooves, i, in the sides of the frames, J, for the purpose of affording an escape for the moisture within the refrigerator as set forth.

Second, The close chambers, k, in connection with the chutes, l, ice-box, K, and filter, or water receptacle, F, all arranged as and for the purpose specified.

Third, The fibrous covering, D, and reservoir, I, in combination with the ventilator, G, and the openings, d, in the walls, B, to operate as, and either with or without the ice-box, K, for the purpose set forth.

Fourth, The combination of the provision shelves, e, inclined plates, f, chambers, k, chutes, l, ice-box, K, fibrous covering, D, ventilator, G, and openings, d, all arranged to form a new and improved refrigerator substantially as set forth.

39,611.—Water Elevator.—Moses C. Bignall, Seneca Falls, and R. F. Osgood, Rochester, N. Y., assignors to Downs & Co., of Seneca Falls:

We claim the inclined lever or bar, M, provided with the cross-head, l, resting over the top of the bucket, and striking against the lugs, m m, or their equivalent, on opposite sides thereof, the whole arranged combined and operating substantially as and for the purpose herein specified.

39,612.—Submarine Explosive Projectile.—Mills L. Callender, Assignor to himself, Charles H. Welling and Egbert Perce, New York City. Ante-dated Oct. 16, 1862:

I claim, first, The application and use of a water rocket or self-propelling vessel, or projectile, to move upon or beneath the water, for the purposes, and in the manner substantially as described.

Second, I also claim driving a torpedo or explosive case or magazine under and through the water at any object, by the momentum gained by the moving force of another body, or by discharging it by other force with a view to explode it under or against a vessel or other object under water.

39,613.—Insulator for Lightning Conductors.—Edwin Eagles, Assignor to himself and J. H. Guion, Mamaroneck, N. Y.:

I claim, first, The fitting of the shank, c, of the holder, C, to a socket, or hole, e, in the pin B, which attaches it to the glass, A, substantially as and for the purpose herein described.

Second, The support, D, having its eye, d, for the reception of the glass set at a right angle to its shank or stem, A, substantially as and for the purposes herein specified.

39,614.—Boots and Gaiters.—James P. Herron, Assignor to Himself and Daniel E. Somes, of Washington, D. C.:

I claim the opening, b, in the manner and for the purpose set forth.

39,615.—Composition for Lining Lead Pipes and other purposes.—Thomas Hodgson, Assignor to Himself and W. E. Doubleday, Brooklyn, N. Y. Ante-dated Nov. 12, 1862:

I claim the composition for the purposes set forth, composed of the several ingredients herein specified, combined substantially as herein described.

[The object of this invention is to obtain a cheap coating for the interior of leaden and other metallic pipes, or cisterns for conveying or containing water for drinking or culinary purposes, which shall at the same time be innocuous in itself, protect the water from the metal of the pipe, or cistern, and preserve the pipe, and to this end the invention consists in a composition of bees-wax, resin, carbon and silicic acid. Mr. Doubleday has assigned his interest in the patent to Wm. Larder, who may be addressed at 120 Fulion street, New York city, in relation thereto.]

39,616.—Soldering Sheet Metal Cans.—Herman Miller, Assignor to C. T. Raynolds, F. W. Devoe and Charles Pratt, New York City:

I claim, first, The employment for containing the melted solder in which the joint of any vessel is to be soldered by dipping, of a solder pan open in the center and containing the solder in a channel of a form corresponding with that of the joint to be soldered, substantially as and for the purpose herein described.

Second the construction of the solder pan with a resting place, e, or its equivalent for the can or vessel to be soldered to regulate the depth to which the joint will enter the said pan, substantially as herein described.

39,617.—Axle Skein.—Henry F. Phillips, Auburn N. Y., Assignor to Messrs. Downs & Co., Seneca Falls, N. Y.:

I claim as a new article of manufacture, the hollow, cast-iron skein or journal, A, provided with the chilled bearing surfaces, f f, extending part way around the same, substantially as herein set forth.

39,618.—Portable Pump.—H. F. Phillips, Ilion, N. Y., Assignor to Messrs. Downs & Co., Seneca Falls, N. Y.:

I claim, first, the pump, B, hand bucket. A, handle, C c, and catch, D, or equivalent, so arranged and combined that the said handle shall serve both for operating the pump, and as a bail for the bucket, as shown and described.

Second, In combination with the foregoing, I claim the stirrup, G, or its equivalent, as herein set forth.

39,619.—Fire Arm.—S. W. Wood, Cornwall, N. Y.:

I claim, the arrangement herein described, of two pawls operating conjointly in the same notch, o, on the face of the hammer, the pawl, D, to discharge the arm by pulling the trigger simply, while the other pawl, w, holds the hammer on guard at full cock, and is liberated by the prong, E, of the pawl, d, hinged to and operated by the trigger, E, to discharge the piece substantially as herein set forth.

RE-ISSUES.

1,523.—Brussels Carpet Loom.—Erastus B. Bigelow, Boston, Mass. Patented March 20, 1847, and extended:

I claim, first, The organized means of operating the pile wires automatically whereby they are successively withdrawn, supported, transferred and inserted substantially as described.

Second, The employment of fingers, or the equivalent thereof, as a means of transferring the pile wires towards their desired position for insertion into the shed of the figuring warps, substantially as described.

Third the method of introducing the pile wires into the shed of the figuring warps by means of a trough, or the equivalent thereof, which supports and carries them into the shed, drops them therein and then moves back for the succeeding wire, substantially as described.

Fourth, The above-described means of supporting the pile wires, while being transferred toward their desired positions prior to and for insertion into the shed of the figuring warps.

Fifth, The above-described means of supporting the pile wires in positions ready for insertion into the shed of the figuring warps, and all equivalent means of effecting the same end, when said means form a part of an organized method of wholly operating the pile wires automatically.

Sixth, The above-described, and all equivalent means of supporting the pile wires while being inserted into the shed of the figuring warps, when said means form a part of an organized method of wholly operating the pile wires automatically.

Seventh, Making the mechanism which weaves or forms the body of the cloth separate and with a distinct organization from the mechanism which operates the pile wires, each mechanism being operated separately, and the two being connected by an intermediate mechanism which starts one of them as it arrests the other, by shifting what communicates the motive power from the one to the other.

1,524.—Aerating Paste or Dough.—Elisha Fitzgerald, New York City. Patented Oct. 8, 1861:

I claim, first, Forcing the dough or paste into the reservoir, A, against the pressure of the gas.

Second, I claim the process of keeping up a continuous supply of dough or paste, under pressure in the receiver.

1,525.—Solar Time Globe.—Theodore R. Timby, Saratoga Springs, N. Y. Patented July 7, 1863:

I claim, first, A globe, A, surrounded by a ring or dial, D, and revolved with the same once in 24 hours in combination with a stationary index, F, substantially in the manner and for the purpose specified.

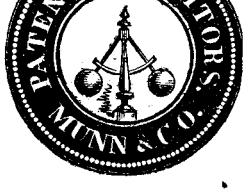
Second, The adjustable dial, C, attached to the ring, D, and revolving with the same, and with the globe, A, under a stationary index, F, as and for the purpose set forth.

[The object of this invention is to arrange a terrestrial globe in such relation to a dial plate and index, that the culminating time of the sun and consequently the true solar time and also the difference of time on different localities of the globe can be observed simultaneously at any moment.]

IMPORTANT TO INVENTORS

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.



THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

© 1863 SCIENTIFIC AMERICAN, INC.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the hortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park ow, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Back Numbers and Volumes of the Scientific American

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out of print and cannot be supplied.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is perserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

Notes and Queries

Q. C., of Mass.—You will find the formula for calculating the flow of water through pipes in "Nystrom's Handbook for Mechanics," page 228, published by J. B. Lippincott & Co., Philadelphia; but more full in Professor Rankin's work on "Prime Movers," page 102—a London publication.

L. R., of Pa.—There is no business directory for the State of New York published, so far as we know.

G. S., of Pa.—Aniline colors cannot be made from petroleum, by any known process, because it does not contain true benzole.

E. J., of Mass.—Skeleton leaves are prepared by macerating in soft water, and exposing them to the sun for several days, until they ferment, when the soft portions may be easily removed with the fingers, or a brush, leaving the fibrous skeletons perfect. To render them white, steep for a short period in a dilute solution of the chloride of lime, then wash and dry them.

J. T. T., of Mass.—Communicate with Charles Seely, editor of the *American Journal of Photography*, No. 244 Canal street, this city, respecting articles for the photographer, their cost, &c., and the other information which you desire.

G. & T., of Ill.—You state that your iron tanks are cylindrical, five-sixteenths of an inch thick and 60 inches in diameter, and you wish to know what pressure of steam they will bear. The practice is to allow about 52,000 pounds for the strength of a square inch of iron; divide this by the diameter (60) in inches of the tank, or boiler, and the quotient is the bursting pressure. It is customary to use steam at only one-third this pressure, and to allow one-third for the weakening effects of riveting. The pressure for your tanks should, therefore, not exceed 60 pounds on the inch; but if you were to hoop them with half inch rings, eighteen inches apart, they would bear a pressure of 90 pounds.

R. W. G., of Ill.—Thomas Prosser, No. 28 Platt street, this city, will give you information, and furnish you with drawn steel rods.

A. R. S., of Ohio.—The Practical Draughtsman's Book of Industrial Design, published by Henry Carey Baird, Philadelphia, is the best you can obtain upon the designing of gearing. The art of cutting gear wheels, however, can only be learned by practice.

J. M. Z., of Ill.—We do not understand, from your letter, what kind of coating you desire for light hardware, such as door handles, latches, &c. The black coating usually consists of a black varnish, which is manufactured and sold for common use in nearly every city. Porcelain door handles are composed of Chinese clay, molded and baked under a high heat in porcelain kilns.

G. W. S., of Boston.—We have received your communication on the rights of authors and inventors to ideas, as permanent property, like real estate. Having fully investigated this subject many years ago, we consider that your conclusions are unsupported by sound reasoning. You will find the subject discussed on page 122 Vol. IX. (old series) of the SCIENTIFIC AMERICAN, and especially on page 237, Vol. II. (old series) of the SCIENTIFIC AMERICAN.

D. J. T., of Ohio.—There is no first rate work published on rifles and gunnery. At present gunnery is in a transition state. Experiment alone can determine the amount of pressure in front of a bullet moving in the barrel of a rifle. The total pressure of the atmosphere is only 15 pounds on the square inch.

D. K., of N. Y.—You will find it troublesome to work a low pressure engine of the size you mention. You had better let it work high pressure. A boiler 4 feet high, and 18 inches diameter, will do the work, providing it contains five flues one inch in diameter, and 3 feet long, or in that proportion. An old boiler flue will answer if you can get fire enough under it to make steam rapidly.

E. G. C., of Mass.—Mr. Gail Borden's address is 36 Elizabeth street, New York. We shall make use of your perpetual motion item.

L. C., of Maine.—We will send you one of our pamphlets of advice by mail. Generally, in doubtful cases, we advise parties to have preliminary examination made at the Patent Office.

C. B., of N. J.—The patent law provides that a design patent may be extended for seven years, upon the payment of $100 to the Patent Office, and otherwise complying with the terms of the law. Our pamphlet fully explains all these matters.

H. C., of Mo.—War is always more or less a temporary calamity; but in measuring its consequences we must look beyond mere temporary issues, and contemplate its effects upon the ultimate interests of the nation. We regard disunion as the greatest calamity that could befall the country. It would insure the destruction of our Government, and promote endless border wars. We must be one people living under one Government; then we shall be great and powerful for all purposes.

N. B., of Cal.—The use of silk for wearing apparel may become more extensive in this country, but it will never supersede cotton and flax tissues. You are surprised at the elegant silks worn by all classes and sexes of Chinese in your State! You must remember that the silkworm and the mulberry are indigeneous to China, and there are twenty persons there for one in America.

A. T., of Mass.—Between three and four feet is the usual quantity of rain that falls in a year; but this year there was nearly that much during the month of July, in some parts of the United States. During the same month (17th of July) it was so cold in England that a severe frost injured vegetation near London.

C. H., of Pa.—Many new American patented agricultural implements are now introduced to Cuban industry, by Don José Macéas, an enterprising Americanized islander, who has recently established a model farm near Matanzas. Connected with it, he has a stock farm, for raising the best breeds of useful farm animals.

P. T., of Wis.—The longest railway tunnel in the world is that between Lyons and Turin, under Mont Cenis: it is more than seven miles in length, and beats the famous Hoosac tunnel of Old Bay State, yet unfinished, through solid granite. The first ficial tunnel we have any account of, is that called the *Grotto di Iipo*, near Naples, Italy, now used as a common roadway. It is through the *tufa* of a mountain spur, between Naples and Barœ.

E. R. S., of Md.—You will find an article on petrole for the fuel of steamers on page 415, Vol. I, current series of the SCIENTIFIC AMERICAN. Whoever informed you that petroleum is cheaper than coal for generating steam, and that it is now used in boilers for fuel, must be mistaken.

J. M. G., of Ill.—We see nothing in your device which differs substantially from, or is of more practical value than the well-known hydrostatic paradox. The experiment would be simple and if you are in any doubt try it.

C. C. R., of N. Y.—You will find the price for binding volumes of the SCIENTIFIC AMERICAN on our advertising page.

R. J. A., of Ill.—There is no loss of useful effect by the transmission of work through the crank of an engine, except the friction on the crank pin. It is an erroneous notion entertained by many persons, that a crank consumes power.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Aug. 19, to Wednesday, August 26, 1863:—

A. G., of Pa., $10; G. B. H., of N. Y., $20; G. W. H., of Iowa, $20; F. A., Jr., of Mich., $20; S. T. S., of Mass., $20; J. C., of N. Y., $20; T. W., of Ill., $20; N. B. B., of N. Y., $20; W. E. N., of Conn., $100; J. F., of N. Y., $20; H. G., of N. Y., $16; W. McK., of Pa., $20; W. W., of Cal., $45; S. & S., of Pa., $20; W. B. R., of Mich., $20; M. W. W., of Mo., $20; C. M., of N. Y., $25; H. W. C., of Vt., $16; H. L., of Mo., $25; W. D, H., of La., $25; M. De C., of Ind., $26; W. X. S., of Mass., $16; G. G. H., of Conn., $16; M. & S., of Vt., $41; M. B. W., of Conn., $25; T. T., of Pa., $16; A. S. L., of N. Y., $16; J. F., of N. C., $15; H. J., of Conn., $16; F. & P., of N. Y., $16; R. W., of N. Y., $16; M. M. C., of Ill., $20; C. J. B., of Ill., $25; H. F. & T. R. B., of Iowa, $16; E. J. E., of Ill., $16; J. W., Jr., of Wis., $5; T. J. K., of Ohio, $25; W. B. K., of Iowa, $15; J. D. C., of Ill., $15; H. & G., of Ill., $20; C. F., of Ill., $25; G. G. C., of N. Y., $16; R. B. Z., of Ohio, $15; D. I. S., of N. Y., $25; G. M. L., of N. Y., $12; W. H. G., of N. Y., $25; H. K., of N. Y., $45; J. D., of N. J., $45; R. B., of Mich., $45; L. S., of N. Y., $25; J. S., of N. Y., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, August 19, to Wednesday, August 26, 1863:—

E. C., of N. Y. (4 cases); H. & C., of Conn.; W. C., of Ill.; M. & S., of Vt.; F. S. G., of Conn.; C. M., of N. Y.; D. J. S., of N. Y.; O. & F., of N. Y.; L. S., of N. Y.; P. Mc. G., of Iowa; T. J. K., of Ohio, O. F. H., of Mass.; M. B. W., of Conn.; J. C. L., of Mo., W. D. H., of La.; M. D., of Ind.; C. F., of Ill.; C. C., of N. Y.; J. S., of N. Y.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement hey may deem objectionable.

A PRACTICAL SOAP MAKER HAS TWO NEW Soaps (Patentable) he wants introduced to the public, there's in them. Address, with stamp for reply, WM. E. BOULGER, Chicago, Ill. 1*

WANTED.—PATENTEE.—ANY PERSON PAYING the expense of procuring the patent on a valuable improvement in a Window Sash Stop and Lock, can purchase the entire right when patented, very low, by addressing LOCK, box No. 541, Providence, R. I. 1*

PATENT FOR SALE.—FISHER'S LAWN OR YARD Mower, Patented 1863. Vibrating cutters; lightest machine made, weighs 35 lbs.; a lady can mow with it. For further particulars, address HENRY FISHER, Alliance, Ohio. 10 4*

TO THE ENTERPRISING AND INTELLIGENT.—I have the right of New Jersey on a Patented machine, which I wish to sell to a party of some means and energy. It is worth a fortune. I will sell it for two thousand dollars. For further information, call or address A. BARRETT, 186 William street, Hoboken, N. J. 1*

FOWLER'S ADDING MACHINE.—STATE AND COUNty Rights, and Machines for sale. This Machine has no equal on the American continent. Cheapness and simplicity, combined with accuracy and speed, is what I claim for it over all others. For further information, address GEO. B. FOWLER & CO., 37 Park Row, Room 21, New York City, or Box 3212 Chicago, Ill. (See cut and description in SCIENTIFIC AMERICAN, No. 10, Vol. 9.) 102*

© 1863 SCIENTIFIC AMERICAN, INC.

ASSISTANT QUARTERMASTER-GENERAL'S OFFICE,
PHILADELPHIA, 24th August, 1863.

SEALED PROPOSALS WILL BE RECEIVED AT THIS office until Tuesday, 15th September next, at 12 o'clock, M., for furnishing Anthracite Coal for the War Department, to be delivered during the year commencing the 1st October, 1863, and ending 30th September, 1864. Coal to be of the best quality Anthracite for use of steamers; to weigh 2240 lbs. to the tun, and to be subject to inspection. The Coal is to be delivered on board vessels in the ports of Philadelphia and New York, in such quantities, and at such times as may be required, furnishing, if demanded, one thousand tons per day. In case of failure to deliver the coal in proper quantity, and at the proper time and place, the Government reserves the right to make good any deficiency by purchase, at the contractor's risk and expense.

The price must be for the coal delivered on board vessels on the terms and conditions above stated. Twenty per cent. will be withheld from the amounts of all payments, which reservation is not to be paid until the contract shall have been fully completed. Payments of the remaining eighty per cent., or balance due, will be made monthly, or when the Department is in funds for that purpose. Each offer must be accompanied by a written guarantee, signed by one or more responsible parties, that the bidder or bidders will, if his or their bid be accepted, enter into obligation with good and sufficient sureties to furnish the supplies proposed. No proposition will be considered unless accompanied by such guarantee. Two or more sureties, in the sum of one hundred thousand dollars, will be required to sign bonds for the faithful performance of the contract, and their responsibility will be certified by a U. S. District Judge, U. S. District Attorney, or Collector. The right is reserved to reject all the bids, if considered to be the interest of the service to do so.

Proposals must be endorsed "Proposal for Coal for the War Department,"

Signed, A. BOYD,
10 2 Captain and Assistant Quartermaster U. S. Army.

OFFICE OF THE SIGNAL OFFICER,
WASHINGTON, D. C., Aug. 8, 1863.

Sealed Proposals will be received at this office until SATURDAY, August 29, 1863, at 4 o'clock, P. M., for furnishing for the Signal Department the following articles:—

250 Two hundred and fifty sets Signal Equipments.
30 Thirty barrels Turpentine.
100 One hundred bales Wicking.
200 Two hundred Telescope Holders.
25 Twenty-five gross Wind Matches.
20 Twenty pounds Linen Thread.
2 Two gross Needles
10 Ten Tap Boeers.
20 Twenty Spigots.

The first delivery to be made about the 15th of September, 1863, or as soon thereafter as Government may direct.

The full name and Post-Office address of the bidder must appear in the proposal.

If a bid is made in the name of a firm, the names of all the parties must appear, or the bid will be considered as the individual proposal of the party signing it.

Proposals from disloyal parties, or where the bidder is not present to respond to his bid, will not be considered.

Proposals must be addressed to "The Signal Officer of the Army," Washington, D. C., and should be plainly indorsed, "Proposals for Field Signal Equipments."

The responsibility of the guarantors must be shown by the official certificate of the clerk of the nearest district court or of the United States District Attorney.

The ability of the bidder to fill the contract, should it be awarded to him, must be guaranteed by two responsible persons, whose siguatures are to be appended to the guarantee, *and said guarantee must accompany the bid.*

Bonds in sums of double the amount involved in the contracts, signed by the contractor and both of his guarantors, will be required of the successful bidder or bidders, upon signing the contract.

FORM OF GUARANTEE.

We ——, of the county of ——, and State of ——, do hereby guarantee that —— is able to fulfill the contract in accordance with the terms of his proposition, and that should his proposition be accepted he will at once enter into a contract in accordance therewith.

Should the contract be awarded to him we are prepared to become his securities.

(To this guarantee must be appended the official certificate above mentioned.)

The right is reserved to reject all proposals, if the prices are deemed too high, or if, for any cause, it is not deemed for the public interest to accept them.

Models will be on exhibition at the office of the Signal Officer for twenty (20) days from date. 8 3

PROPOSALS FOR CONSTRUCTING A BRICK TUNnel under Lake Michigan, two miles long, for the City of Chicago

OFFICE OF THE BOARD OF PUBLIC WORKS,
CHICAGO, August 13th, 1863,

Sealed Proposals will be received at this office till Wednesday, September 9th, at 11o'clock, a. m., at which time the Board will open the same, for doing all the work and furnishing all the materials required for the construction of a brick tunnel, five feet clear diameter, and extending from the present pumping works of the city, two miles out under the bed of Lake Michigan, and through what numerous borings invariably show to be a stiff blue clay soil, together with land and lake shafts, and protecting cribs, in accordance with the plans and specifications for the doing of said work, to be found on file in the office of this Board on and after the 19th inst.

The Board would prefer to let the entire work to one contractor or company, but will receive separate proposals for the tunnel proper and land shaft, for the protecting cribs, and for the cast-iron cylinders for lake shafts.

The Board reserves the right to reject any or all bids, and to accept any one bid complying with the conditions of this advertisement.

The bids must be sealed, and must be accompanied with a bond of the penal amount of $200, blanks for which will accompany the specifications, guaranteeing the execution of a contract in accordance with the bid, in case the bid is accepted.

Proposals must be directed to the Board of Public Works, and indorsed "Proposals for Lake Tunnel."

Satisfactory security for the faithful performance of the work will be required of the parties whose bids may be accepted.

J. G. GINDELE,
FRED LETZ,
F. C. SHERMAN,
9 2 Board of Public Works.

PLATINA! ALL SHAPES! FOR ALL PURPOSES. Imported by SUTTON & RAYNOR, 748 Broadway, N. Y. 10eow4*

REAPERS AND MOWERS INDEPENDENT AND "Combined."—Parties desirous of engaging in the manufacture of those successful and popular machines, the "Cayuga Chief," "Cayuga Chief No. 2," or "Cayuga Chief, Jr.," can address the patentee, C. WHEELER, Jr., Poplar Ridge, Cayuga County, N. Y. 10 8*

DEAFNESS.—SOUND MAGNIFYING TUBES OR Artificial Ears. Instantaneous relief. Send for a Descriptive Circular to E. HASLAM, 32 John street, New York. 10 2*

DISCHARGED SOLDIERS AND OTHERS ARE MAking enormous wages in the Stencil business. Don't fail to send for a free Catalogue containing full particulars. Address MILLIKEN & DAVIS, Brandon, Vt. 10 6*

TO PRACTICAL BOLT AND NUT-MAKERS.—WANTED, a steady, reliable man who has had practical experience in making pressed bolts and nuts. A good situation, with prospect advancement, will be assured. Address, stating terms and full particulars, B. D. H., Box 447, Pittsburgh, Pa. 7 4*

LANE'S PATENT LIFTING JACK—VERY EASILY operated, compact, simple and cheap. For cut and description see page 405, Vol. VIII. (new series), SCIENTIFIC AMERICAN. Staet rights for sale. Communications in relation to rights or orders for Jacks may be addressed to J. G. LANE, Washington, N. Y. 10 8

NERVOUS DISEASES AND PHYSICAL DEBILITY, arising from Specific causes, in both sexes—new and reliable treatment, in Reports of the Howard Association—sent in sealed letter envelopes, free of charge. Address Dr. J. SKILLIN HOUGHTON, Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 10 4

A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-Issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York. 9

MARINE STEAM ENGINE.—JUST PUBLISHED.—Questions on subjects connected with the Marine Steam Engine, and Examination Papers, with Hints for their Solution. By Thomas J. Main, M. A., Math. Prof. Royal Naval College, Portsmouth, and Thomas Brown, Chief Eng. R. N., attached to R. N. College. In one volume, 12mo., price $1·50. ☞ On the appearance of some questions at the end of the second edition of the Marine Steam Engine, it was suggested to the Authors that a separate work, containing a more copious collection of examples of the same kind, systematically arranged, would be highly useful to many who have not the advantage of a tutor. To this end, the Authors have endeavored to arrange the following questions in order of difficulty: and have either given partial hints, or have worked out the question in detail wherever it has been thought necessary. Examination papers also have been added, that the student may test his own acquirements; but he is recommended not to attempt them until he feels confident in his knowledge of the subject.—*Preface.*

Also published, A Treatise on Screw Propellers and their Steam-Engines. By J. W. Nystrom. Illustrated by 32 large drawings, 8vo., cloth, $3·50.

A Handbook for Locomotive Engineers and Machinists. By Septimus Norris, C. E. New edition, illustrated, 12mo., cloth, $1·50.

Colburn on the Locomotive Engine; including a Description of its Structure, &c. Illustrated. 12mo., cloth, 75 cents.

Practical Examinator on Steam and the Steam Engine. By William Templeton. 12mo., 75 cents.

☞ The above, or any of my books, sent by mail free of postage. Every reader of the SCIENTIFIC AMERICA is particularly invited to send for a catalogue, which will be sent free of postage. HENRY CAREY BAIRD, Publisher of Practical and Scientific Books, 406 Walnut street, Philadelphia. 8 3

B. T. BABBITT ON MAKING BREAD, WITH FULL directions on each package of Salaratus, showing how to make the best of bread from materials that farmers always have on hand. Bread made in this manner contains nothing but flour and common salt and water; it has an agreeable taste; keeps much longer than common bread; is more digestible and much less disposed to turn to acid. Common bread, like every thing that has been fermented, ferments again to the great discomfort of many stomachs, and not only so, but acting as a ferment, it communicates to all food in contact with it. The bread being free from all yeasty particles, is more digestible and not so likely to create flatulence or turn acid on weak stomachs as fermented bread is apt to do, and, when of the finest quality, it is beneficial to those who suffer from headache, acidity, flatulence, eructations, a sense of sinking at the pit of the stomach, distension or pains after meals, and to all who are subject to gout or gravel; it is also useful in many affections of the skin; a saving of 25 pounds of flour per barrel is effected by this process. Be sure and get that with B. T. BABBITT'S name on, or you will not get the recipe with sour milk, nor the quality. For sale by store-keepers generally or at the manufactory, Nos. 64 to 74 Washington street, New York. 25 tf

---

VULCANIZED RUBBER—

Adapted to mechanical purposes—MACHINE BELTING, STEAM PACKING, VALVES, HOSE, EMERY VULCANITE WHEELS, &c. &c. Directions, prices, &c., can be obtained on application to the NEW YORK BELTING AND PACKING COMPANY, Nos. 37 and 38 Park Row, New York.

JOHN H. CHEEVER, Treasurer. 4tf

TO STEAMSHIP AND STEAMBOAT OWNERS AND BUILDERS.—For sale—Two Low-pressure Beam Engines—one 11-feet stroke and 72-inch bore cylinder, and the other a double cylinder engine, formerly used in the steamer *Buckeye State*, on Lake Erie. The outside cylinder is 81-inch bore, and the inside cylinder 36-inch bore and 12 feet stroke, and was, when in use, remarkable for its great economy in fuel. Both engines are in good order. For further particulars or information address E. B. WARD, Detroit, Michigan. 8 4*

FIBER-CLEANING MACHINE.—THIS VALUABLE machine, the invention of Eduardo J. y Patrullo, and illustrated on page 368, last volume, SCIENTIFIC AMERICAN, is now on exhibition, where the public are invited to examine it, at the establishment of TODD & RAFFERTY, No. 13 Dey street, New York. 2 13

WANTED—SCRAP IRON, OLD BOILERS, AND OLD Iron Machinery.—The subscribers will pay cash for any quantity of Wrought or Cast Scrap Iron, Old Boilers, and Old Iron Machinery, delivered at their warehouse, 28, 30, and 32 Terrace street, Buffalo, or at their Rolling Mill and Nail Factory, Black Rock, N. Y.

Buffalo, July, 1863. PRATT & CO
2 10*

FAN BLOWERS—DIMPFEL'S, ALDEN'S, McKENZIE'S and others, for Steamboats, Iron Works, Founderies, Smith Shops, Jewelers, &c., on hand for sale by LEACH BROTHERS, 86 Liberty street, New York. 2 13*

IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 1tf

---

PAYE'S PATENT FORGE HAMMER—ADAPTED TO both heavy and light forgings, with an adjustable stroke of from one inch to three feet, on hand for sale by LEACH BROTHERS, 86 Liberty street, New York. 1 13*

MACHINERY.—S. C. HILLS, No. 12 PLATT-STREET New York, dealer in Steam Engines, Boilers, Planers, Lathes Chucks, Drills, Pumps; Mortising Tenoning and Sash Machines; Woodworth's and Daniels' Planers, Dick's Punches, Presses and Shears; Cob and Corn Mills; Harrison's Grist Mills; Johnson's Shingle Mills; Belting, Oil, &c. e

---

RE-SLITTING UPRIGHT SAW MILL FOR SALE.—Latest improvement of the Crosby Patent. Price $250.

9 2* H. D. CRANE & Co., 363 W. 29th Street.

R. J. IVES, BRISTOL, CONN., MANUFACTURES all kinds of machine and fancy screws. Address as above. 6 10*

A MESSIEURS LES INVENTEURS.—AVIS IMPORTant. Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessine tune description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
Scientific American office, No. 37 Park Row, New York.

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
No. 37 Park Row, New York City

OIL! OIL! OIL

For Railroads, Steamers, and for Machinery and Burning. PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The SCIENTIFIC AMERICAN, after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the United States and 24 13*

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.

1 tf GUILD, GARRISON & CO

VALUABLE DOCK PROPERTY FOR SALE.—THE subscriber offers for sale a valuable plot of ground on Newtown Creek, near Penny Bridge, in the city of Brooklyn. The property is very desirably situated in the Seventeenth Ward, Meeker avenue, a great thoroughfare, forming the southerly boundary of the premises. A valuable dock privilege of over 400 feet on Newtown Creek, renders the property very desirable for large manufacturing or storage purposes. Vessels of six or eight feet draft can navigate the creek at low tide, and of much greater capacity at high water. The upland and water privilege comprise about nineteen acres, and will be sold very cheap, and the terms of payment made liberal. For further particulars, address J. B. BULLOCK, attorney for the owners, No. 39 Nassau street, New York. 22tf

---

SAVING OF FUEL TO PARTIES USING STEAM.—DAMPERR EGULATORS.

Guaranteed to effect a great saving in fuel, and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 5 Park Place, New York.

16 26*

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All warranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 2 13

---

250 RARE RECEIPTS—FOR MECHANICS AND their wives—tells what to do and how to do it. The book sent free for fifteen cents. HUTCHINSON & CO., Publishers, 442 Broadway, New York. 7 7*

BLACK DIAMOND STEEL WORKS, PITTSBURGH Pa. PARK, BROTHER & CO., manufacturers of best quality Refined Cast Steel, square, flat and octagon, of all sizes. Warranted equal to any imported or manufactured in this country. Office and Warehouse, Nos. 149 and 151 First street, and 120 and 122 Second street, Pittsburgh, Pa. vol. 8 11 1y*

POWER LOOM WIRE CLOTHS AND NETTINGS, superior in quality and at low prices, by the CLINTON WIRE CLOTH COMPANY, Clinton, Mass. N. B.—Our trade-mark "Power Loom Wire Cloth." vol 8 24 3t*

BOLTS, NUTS AND WASHERS OF ALL SIZES CONstantly on hand for sale by LEACH BROTHERS, 86 Liberty street New York. 1 13*

COTTON GINS! COTTON GINS!! THE NEW YORK Cotton Gin Company manufacture and offer for sale the Excelsior Roller Gin for Sea Island or long staple cotton; also Brown's celebrated Double-cylinder Saw Gin for upland or short staple. The above Gins are acknowledged to be without their equal; they do more work and produce a better sample than any offered in the market. We also manufacture a large variety of hand Gins, both for long and short staples. Persons intending to order for the coming crop of cotton will do well to do so soon, in order to secure their Gins in season. FRANKLIN H. LUMMUS, General Agent, No. 32 John street, New York. 25 13*

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

Daselbst ist zu haben:

Die Patent-Gesetze der Vereinigten Staaten.

nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.

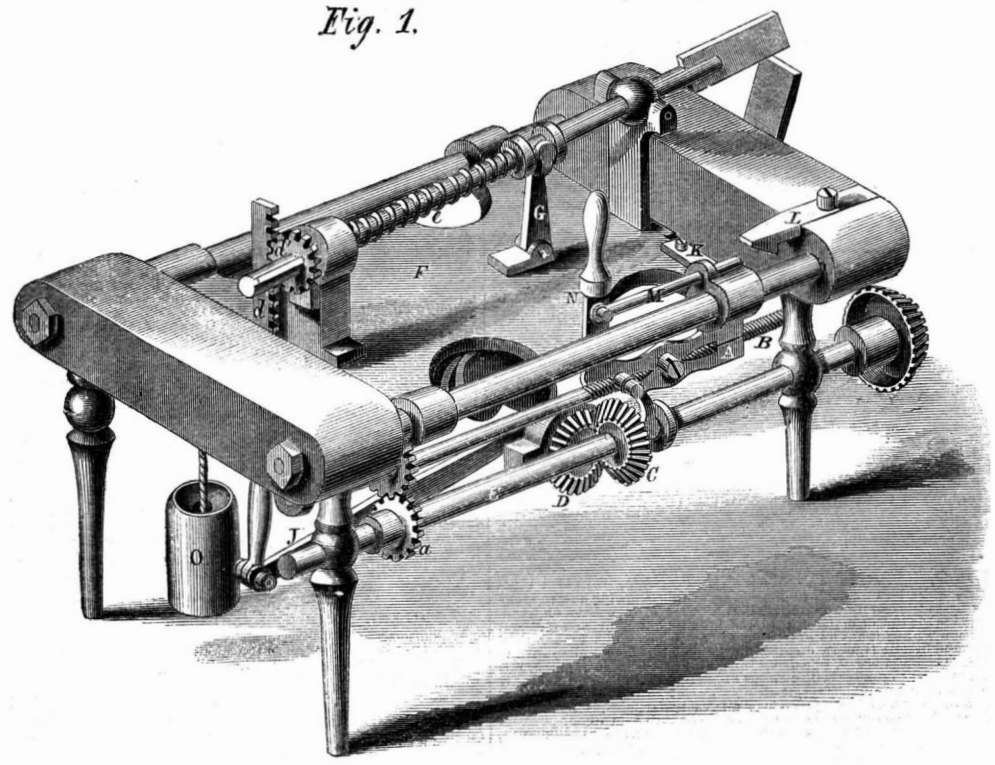
Preis 20 Cts., per Post 25 Cts.

© 1863 SCIENTIFIC AMERICAN, INC.

Improved Nail Plate Feeder.

In the accompanying engravings Fig. 1, represents a perspective view, and Fig. 2, a vertical, longitudinal section of a machine invented by Mr. J. S. Fisk of Youngstown, Ohio, for feeding nail plates, from which blanks are to be cut by the shears. In cutting nail blanks, it is necessary, in order to form the head, point, and required taper of the nails, to change the relative positions of the nail plate with the shears after every cut. The taper will then be made alternately in opposite directions across the plate, and the latter worked up evenly to the end. This may be effected by turning either the shears or the plate in a horizontal plane, after each motion; but more practicably by feeding the plate in a uniform direction, slightly oblique to the shears, and inverting the plate after each nail is severed. Before the plate can be inverted, it must be drawn back and elevated to clear it from the shears. The object of the present invention is to produce these various complicated motions, including the regular feeding forward of the plate, by automatic machinery. The construction of the machine by which this result is attained will be understood from the following description of its operation.

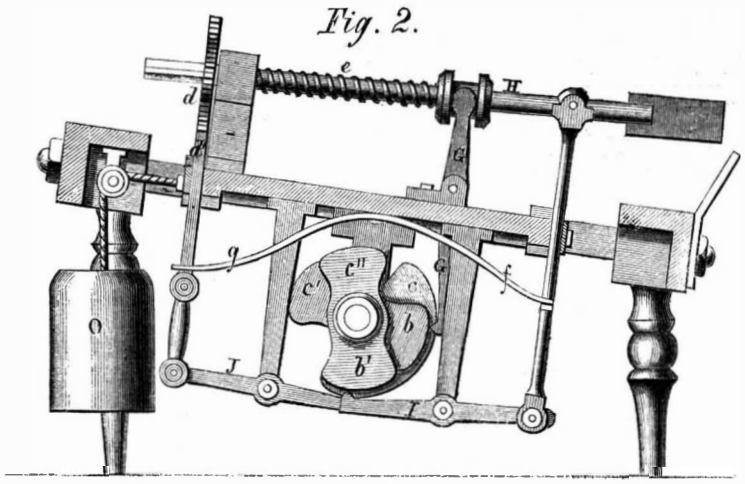
Fig. 1.



FISK'S PATENT NAIL PLATE FEEDER.

The divided nut, A, being in gear with the screw, B, and the bevel pinion, C, being in gear with the pinion, D, as shown in Fig. 1, rotation is imparted to the shaft, E, by steam or any other suitable power. This communicating through the gearing, *a*, to the screw shaft, B, working within the nut, A, advances the carriage, F, at a regular speed. When a nail blank has been severed, the cam, *b* (see Fig. 2), bearing against the lower end of the lever, G, retracts the plate rod, H, and the cam, *b*, depressing the inner end of the lever, I, raises the forward end of the said rod preparatory to the inversion of the plate. The cam, *c*, then depresses the inner end of the lever, J, which, acting through the medium of the rack and pinion, *d d'*, turns the plate rod one half round, so as to invert the nail plate. The cams, *b* and *b'*, then release their respective levers, and the springs, *e* and *f*, restore the plate rod to its lower and forward position; the motion of the carriage having, in the mean time, advanced the plate far enough for the separation of another blank. While this is being effected, the continued pressure of the cam, *c*, upon the lever, J, holding the rack stationary, keeps the plate from turning; and it is so held until the cams, *c' c''*, again act upon the levers G and I, so as to elevate and retract the plate rod as before explained. This done, the cam *c*, releases the lever, J, and the spring depressing its outer or rear end, draws down the rack, *d'*; this again inverts the plate, and holds it until it has been again restored to position for cutting, and another blank severed; after which the work proceeds as before explained.

Fig. 2.



When the carriage reaches its forward position, and a plate has been used up, the spring catch, K (see Fig. 1), passing under the stationary cam, L, is retracted from the rod, M; upon which a spring throws back the lever, N, and opens the hinged nut, A, permitting the weight, O, to draw the carriage, F, back, and at the same time throws the bevel pinion, D, out of gear with its pinion, C. The machine then remains at rest until a new plate has been supplied to the rod and the lever, N, restored to its forward position; which throws the whole apparatus into gear, and the work proceeds as long as plates are furnished.

The engraving represents the plate retracted, elevated, and in the act of turning. A patent for this invention was procured through the Scientific American Patent Agency, on June 30, 1863; further particulars can be obtained by addressing the inventor, Mr. J. S. Fisk, or Messrs. Van Brocklin & Jones, at Youngstown, Mahoning county, Ohio.

It is officially reported that out of those persons usually employed in the mills in the cotton districts of England, about 234,642 are now in full work, 125,097 on short time, and 180,729 out of work; against 192,527 full time, 129,741 on short time, and 215,512 out of work some months since.

PROSPECTUS

OF THE

SCIENTIFIC AMERICAN.

THE BEST MECHANICAL PAPER IN THE WORLD.

NINETEENTH YEAR!

VOLUME IX.---NEW SERIES.

The publishers of the SCIENTIFIC AMERICAN beg to announce that on the fourth day of July, 1863, a new volume commenced, and it will continue to be the aim of the publishers to render the contents of each successive number more attractive and useful than any of its predecessors.

The SCIENTIFIC AMERICAN is devoted to the interests of Popular Science, the Mechanic Arts, Manufactures, Inventions, Agriculture, Commerce, and the Industrial pursuits generally, and is valuable and instructive not only in the Workshop and Manufactory, but also in the Household, the Library and the Reading Room.

The SCIENTIFIC AMERICAN has the reputation, at home and abroad, of being the best weekly journal devoted to mechanical and industrial pursuits now published; and the proprietors are determined to keep up the reputation they have earned during the eighteen years they have been connected with its publication.

Chemists, Architects, Millwrights and Farmers!

The SCIENTIFIC AMERICAN will be found a most useful journal to them. All the new discoveries in the science of chemistry are given in its columns, and the interests of the architect and carpenter are not overlooked; all the new inventions and discoveries appertaining to those pursuits being published from week to week. Useful and practical information pertaining to the interests of millwrights and millowners will be found published in the SCIENTIFIC AMERICAN, which information they cannot possibly obtain from any other source; subjects in which planters and farmers are interested will be found discussed in the SCIENTIFIC AMERICAN; most of the improvements in agricultural implements being illustrated in its columns.

To the Inventor!

The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in those old countries. From those journals we shall continue to transfer to our columns copious extracts of whatever we may deem of interest to our readers.

To the Mechanic and Manufacturer!

No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERICAN. It costs but six cents per week; every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication. It is an established rule of the publishers to insert none but *original* engravings, and those of the first class in the art, drawn and engraved by experienced artists, under their own supervision, expressly for this paper.

TERMS.

To mail subscribers:—Three Dollars a Year, or One Dollar for four months. One Dollar and Fifty Cents pay for one complete volume of 416 pages; two volumes comprise one year. A new volume commenced on the fourth day of July, 1863.

CLUB RATES.

Five Copies, for Six Months	$6
Ten Copies for Six Months	12
Ten Copies, for Twelve Months	20
Fifteen Copies, for Twelve Months	34
Twenty Copies, for Twelve Months	40

For all clubs of Twenty and over the yearly subscription is only $2 00. Names can be sent in at different times and from different Post-offices. Specimen copies will be sent gratis to any part of the country.

Western and Canadian money or Post-office stamps taken at par for subscriptions. Canadian subscribers will please to remit 25 c extra on each year's subscription to pre-pay postage.

MUNN & CO., Publishers
37 Park Row, New York.

© 1863 SCIENTIFIC AMERICAN, INC.